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Par P. ALLORGE et G. HAMEL

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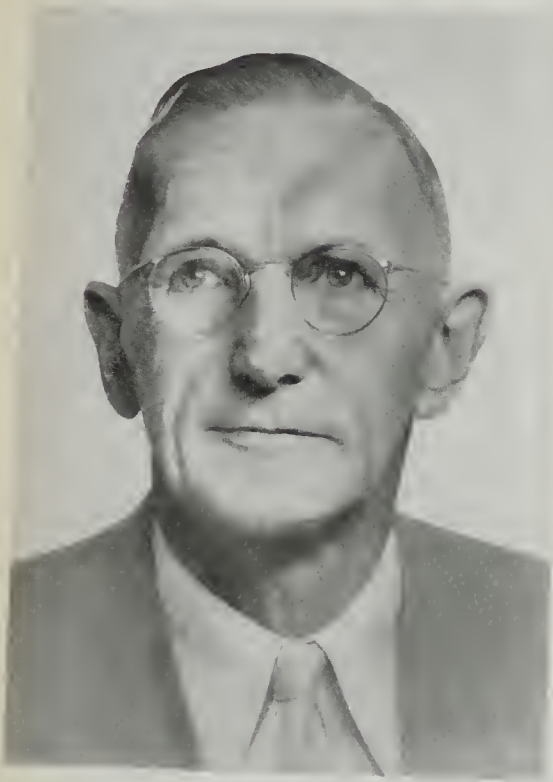

Gilbert-Morgan Smith
(1885-1959)

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Gilbert Morgan Smith
1885-1959

by Paul C. SILVA
University of Illinois, Urbana.

■

Certain men seem destined to exert extraordinary influence on the thought and actions of their fellow men. Within the framework of botanical teaching in the twentieth century, the late Gilbert Morgan Smith was a remarkably influential person.

Smith was born at Beloit, Wisconsin, on January 6, 1885. He received preparatory education at Williston Academy and then attended Beloit College, where he was awarded the Bachelor of Science degree in 1907. After teaching high school at Stoughton, Wisconsin, for a year, he took advanced work at the University of Wisconsin under the direction of Professor Charles E. Allen, receiving his doctorate in 1913. Smith was retained on the faculty at Wisconsin and rose through the academic ranks until 1925, when he moved to Stanford University as Professor of Botany. In 1950 he became emeritus but continued to work as his health would permit until his death on July 11, 1959, in Palo Alto, California.

Smith's research interests at first were with fresh-water algae, especially the morphology and taxonomy of Chlorococcales and Volvocales and plankton surveys. His monograph of *Scenedesmus* (1916), based upon pure cultures, and his study of the phytoplankton of the inland lakes of Wisconsin (1920, 1924) were notable achievements of this early period. After moving to California, Smith became interested in marine algae in connection with a field course which he taught each summer at the Hopkins Marine Station, Pacific Grove. The third and final phase of his research centered in the sexuality of *Chlamydomonas*, and he was largely responsible for reopening the question of the significance and validity of Moewus's work.

Although Smith's contributions in research were considerable, far greater importance must be accorded his achievements in the

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field of text and reference book writing. Hundreds of teachers in colleges and universities throughout the United States and in several other countries rely upon one or more of his books. Examination of these major works supports the point of view that SMITH should perhaps be considered a master organizer rather than an influential teacher. But one must have seen him at work to fully appreciate his talent for organization. At the time I arrived to study with him (1947), he had completed *Marine Algae of the Monterey Peninsula*, was engaged in producing the *Manual of Phycology*, and would soon begin a systematic revision of *The Fresh-water Algae of the United States*, the « Wisconsin » general botany text, and *Cryptogamic Botany*. The Monterey book contains much original research, but above all it is a monument to skillful organization. While SETCHELL and GARDNER were bogged down in their formidable task of treating the red algae for the Pacific North American flora, SMITH, by confining himself to a small area by utilizing materials assembled at Berkeley by SETCHELL and GARDNER, and by enlisting the aid of KYLIN, of his former student George J. HOLLENBERG, and of a competent artist (Mrs. Carl F. JANISH), was able to produce a masterly local flora. As with any taxonomic work, one must use it to be able to evaluate it; those who use *Marine Algae of the Monterey Peninsula* will have the gratifying experience of encountering keys which generally work and descriptions and illutrations which fit the material at hand. While impatiently awaiting the long delayed appearance of the *Manual*, SMITH took his working copy of *Fresh-water Algae* from the shelf and, after obtaining unpublished work from G. W. PRESCOTT and R. H. THOMPSON (the latter a former student), began to prepare copy for a revised edition. The actual revisionary work had been done through the years. Whenever a reprint was received which in any way affected one of his books, SMITH would then and there sit down at his wonderfully antiquated typewriter and with unorthodox fingering rapidly peck out a phrase, a sentence, or a paragraph, and paste it in its proper place in one of several loose-leaf notebooks. Like FRITSCH, SMITH enjoyed a prodigious command of the algae, which enabled him to assimilate new material without hesitation.

Among numerous honors accorded SMITH may be mentioned the award of an honorary Doctor of Science degree from Beloit College in 1927 and election to the National Academy of Sciences in 1948. He served as president of the Botanical Society of America, the American Microscopical Society, and the Phycological Society of America.

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Physically, SMITH was imposing. He was tall, gainly, handsome. The non-professional aspects of his life were as rich as his professional career. He and his wife, Helen née PFUDERER, were gracious host, active in society. They traveled extensively, to the far corners of the world. In an age when academicians tend to be narrowly trained technicians, SMITH stands out as a gentleman : socially, politically, philosophically, and religiously aware.

SMITH's death has grieved countless numbers of friends, each of whom cherishes particular memories, perhaps of happy hours with « Gib » on the golf course, or of the excitement of early morning collecting trips on the Monterey Peninsula. Being associated with a man only during the twilight of his career provides an incomplete and biased picture, yet I am grateful for even a glimpse into the life of such a distinguished person as Gilbert Morgan SMITH.

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(*) Compiled with the aid of Dr. Robert M. PAGE of Stanford University, to whom I am indebted also for transmitting the photograph reproduced herein.

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Re-evaluation of the genus Gomontiella

by Gyorgy CLAUS

■

In the month of July, 1954, we carried out algological collections in the thermal spring of Bükkszék and while working up the material we found an interesting rare *Cyanophyton*, a *Gomontiella*. Up to the present time on single species of this genus has been known, *Gomontiella subtubulosa*, described by Teodoresco from Rumania in 1900. Since that time, nobody has succeeded in finding this species, and we do not possesss any other specimen besides this exciccated one. Having become extinct in its habitat it cannot be subjected to scientific examination. The alga we found cannot be identified with the species described by Teodoresco, yet we must rank it, owing to its morphological features, in the genus *Gomontiella*.

The termal spring of Bükkszék is situated in the North of Hungary, on the slope of the hill Darno, Between Parád and Ozd in the Mátra Mountains. The water rushes up from a depth of 517 m., its temperature is 39.9 C°. The water contains a great quantity of dissolved CO_2 and mineral substances (296, 347 g/l). In order to remove the gases the water runs into a small degasifying basin. From there, conveyed in a concrete trough, it supplies the medicinal bath established next to the spring. The top of the degasifying basin is covered with planks, on the inner side of which a rich layer of algae is evident, being sprayed by the dispersed water only. In this alga coat we found some specimens of the new species of the genus above mentioned. The new species we named *Gomontiella marthae*. Its description is a follows.

The filament is about 40-50 μ long, erect, and dirty bluish-green with a brownish tint. At the septa it is considerably constricted. The diameter of the filament, which is bent into a tube, is, at the basic part, 11-13 μ; at the apex, 7-8 μ. The cells are 1,4-2,8 μ long, their edges bending together with a distance of 4, and occasionally 5-6 μ, between them. In cross-section, the tube is more or less elliptical, the bent-back borders being of unequal length (4,2-2,8 μ respectively). The cells of the filament when spread out, are 8-10 times as broad as they are long (cf. Fig. 1-6).

We succeeded in observing the longitudinal division of some filament. The process is a follows : after the tubular filament has attained its normal measurements (diameter of 8-13 μ), a

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constriction takes place in the dorsal part of the cells (Fig. 6), proceeding inward up to the wall of the tube facing the interior of it. Meanwhile, the central parts of the cell-halves which are still connected are curving inward condiserably. Finally the two cells, viz. the tubes consisting of these cells which have been formed this way, separate. Now, it may happen that the two tubes do not separate completely (the division proceeding gradually from the base of the filament towards the apex) before new constrictions appear on the basal cells of the filament (Fig. 4). Thus we may see on the basal part, the initial stages of four tubes when there are only two fully developed tubes towards the apex.

Trichoma longitudinis 40-50 μ, erectum, sordide glaucescens-viride pullo obumbratum. Septa articulata sunt. Trichoma in tubulum flexum, in parte basali habet latitudinem 11-13 μ, in apice 7-8 μ. Longitudo cellularum 1.4-2.8 μ marginibus conflexis, inter cellulas minimum spatium 4 (5-6 μ) perspicitur. Forma transversalis tubuli elliptica, sed margines haud aeque conflectuntur (4.2 ev. 2.8 μ). Latitudo cellularium trichomatis explicati octies, vel decies major est, quam longitudo. Contigit nobis animadvertere divisionem longitudinalem singulorum trichomatum.

By a fortunate accident, I succeeded in finding another species of *Gomontiella*. On the 18 th of May, 1954, the geologist, GABRIEL MAGYARI, handed over to me some pieces of stone and some scraping from the wall of a passage, so far unknown, of the cave Kölyuk in Mánfa, to be examined. On the scraping there was seen a quaint, crusty, greenish-blackish coat. I put this material in Petri dishes containing sterile Knop's nutritive solution. In about three months the algae appearing in the above -mentioned coat became numerous and upon microscopical examination I found a *Cyanophyton* of particular construction; a *Gomontiella* among them. The ecological conditions of the algal habitat are so unusual that it is of some interest to deal with it at some length.

The cave Kölyuk of Mánfa, is situated in the South of Hungary in the Mecsek Mountains. The main passage of the cave, so far as presently known, is about 200 m. long with a little lake at its end. The temperature of the water is 9,5-10 C°. The relative humidity is 95-100 %. In this part of the cave complete darkness prevails. (The back part of the cave, opened up by MAGYARI and his companions, can be entered only by swimming under the water.) Thus the abovenamed algae are living in full darkness, isolated hermatically from the outside world. For the function of assimilation these algae cannot make use of any sort of energy we know of at the present time. Hence it is an open question as to what kind of energy source they utilize. Relying upon the investigations in several caves in Hungary, we can consider as an authentic fact

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that the algae do not occur in similar conditions as resting spores living a latent life, but rather carry on a very active assimilatory and multiplying function.

In honor of the geologist, GABRIEL MAGYARI, who led the opening up of the cave Kölyuk in Mânfa, I named the species *Gomontiella magyariana*. Its description is as follows.

The filament is 150-200 μ long, erect, of brownish-green color. Along the septa it is considerably constricted. The filament which is « inrolled » into a tube, is 9.45 μ broad. The cells are 2 μ long, their edges bent together, with a distance of at least 3 μ between them. In cross-section, the tube is elliptical, the bent-back borders being equally long (2,3 μ). The cells of the filament when spread out, are 6-7 times as broad as they are long (Fig. 9). The filament often pulls apart so that the two adjacent cells remain in connection with their alternate ends only (Fig. 10, 11). The filament, however, does note separate into individual cells. I also succeeded in observing hormogonia.

Trichoma longitudinis 150-200 μ, erectum, obumbrato viride. Septa articulata sunt. Trichoma in tubulum flexum latitudinem 9.45 μ habet. Longitudo cellularum 1.6-2 μ marginibus conflexis, inter cellulas minimum spatium 3 μ perspicitur. Forma transversalis tubuli elliptica et margines aeque conflectuntur (2.3 μ). Latitudo cellularum trichomatis explicati sexties vel septies maior est, quam longitudo. Hormogonia videri possunt.

The discovery of the two species referred to above, and especially the observing of their division's process, made it necessary to subject the taxonomical place of the whole genus *Gomontiella* to a scientific investigation.

The taxonomical place of the genus *Gomontiella* Teodoresco has not been cleared up sufficiently. TEODORESCO considers it to be a member of the order *Hormogonales*. GEITLER (1925) ranks it into the family *Oscillatoriaceae* of the order *Hormogonales*. In his work which appeared in 1932 (RABENHORST' Kryptogamenflora, p. 985), he maintains his former opinion. FRITSCH (p. 832, 1945) describes it as a genus belonging to the family *Oscillatoriaceae* of the order *Nostocales*. ELENKIN (p. 715, 1949) raises it to the rank of an independent family, and includes it in the order *Hormogonae* (THUR.) ELENK. His opinion is reflected essentially by POLIANSKY (HOLLERBACH, KOSSINSKAJA, POLIANSKY, p. 618, 1952) too, by whom it is accepted as an independent family and considered as a member of the order *Oscillatoriales* set up by the author. Also E. W. SCHMIDT (p. 54, 1954) mentions the family *Gomontiallaceae* in the suborder *Nostocinales* of the order *Hormogonales*.

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Neither LINDAU-MELCHIOR (1930) nor DROUET (1951) makes mention of the genus or the family.

In our opinion, the taxonomical classification of the class *Hormogoneae*, i.e., the correct taxonomical place of the species above, is as follows :

Classis *HORMOGONEAE* (THUR.) ELENK.

Filamentous multi-cellular algae. The threads are free, they very seldom grow together with their side-branches. The cells unite by plasmodesms and form a so-called trichome. Heterocysts may occur or be lacking. The multiplication takes place especially by hormogones, much more seldom by spores or hormocysts.

I. They always have heterocysts although these are sometimes difficult to see.

Stigonematales Kossinsk.
Diplonematales Kossinsk.
Mastigocladales Kossinsk.
Nostocales Fritsch.

II. Heterocysts are always missing.

1. The threads multiply by hormogones, by longitudinal and transversal division : *Gomontiellales* mihi.
2. The multiplication takes place by hormogones, longitndinal division does note occur : *Oscillatoriales* Poliansk.

1. Ordo : *Gomontiellales* mihi.

Erect filament bent together into a longer or shorter tube having, on the whole, parallel edges. The cells are curved in semi-circle or full circle, their ends bending towards each other. The division of the cells may be longitudinal and transversal. One single family with a single genus and four species belong here.

Gomontiellales *nov. ordo.*

Trichomata erecta longa aut brevia in tubulos flexos marginibus plus minusve parallelis conflexis. Cellulae semicirculi, aut circuliformes marginibus conflectentibus, divisionibus duis directionibus : longitudinalis et transversalis. Ordo monotypicus, familiam unam, genus unum, speciei quattuor continet.

Familia : *Gomontiellaceae* Elenkin.

The characterization of the family agrees with that of the order.

Genus : *Gomontiella* Teodoresco.

The characterization of the genus agrees with that of the order.

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A. Short tubes of a few cells, or the cells of the filament becoming readily detached from one another. Length of a cell 0,5-0,75 μ.

G. hamiformis (Fig. 8).

B. Longer tubes of many cells.

a. Filament long, up to 200 μ.

+ Breath of the tube, 19,8-24,2 μ.

The ends of the curver cells may meet, greatest distance between them, 2 μ.

G. subtubulosa (Fig. 7).

++ Breadth of the tube, 9,4 μ; the ends of the inrolled cells never meet, there is at least a distance of 3 μ between them. The cells of the filament may separate so that their alternate ends meet only.

G. magyariana (Fig. 9, 10, 11).

b. Filament shorter, up to 50 μ. Breadth of the tube, 8-13 μ; the ends of the inrolled cells never meet, there is a distance of 6-7 μ between them.

G. marthae (Fig. 1, 2, 3, 4, 5, 6).

1. *Gomontiella hamiformis* (Pascher) Claus n. comb. = *Cyanarcus hamiformis* Pascher (Pascher : Symb. Spaltp. Flagell. mit Blaualg. *Ber. d. Deutsch. Bot. Ges,* 32, p. 351, tab. 7, Fig. 2, 24, 1914).

Threads of 2-4 cells, the cells being curved, bent together into a tube with their edges. The cell is 0,5-0,75 μ de long and 3-4 μ broad; bluish-green. The thread is constricted along the septa (Fig. 8).

According to Pascher, cells are found also separately and he mentions that he observed longitudinal division. His figure Nr. 24 which he himself marks with a note of interrogation is, in all likelihood, a species of *Gomontiella*. We thought it therefore necessary to rank the above-mentioned species into the genus *Gomontiella* owing to its characteristic features. For this reason, the genus *Cyanarcus* set up by Pascher will not stand the test as a taxonomical catagory. It is Geitler (1932, p. 287) who has already remarked in connection with the species *Cyanarcus hamiformis* Pascher : « Die Alge zeigt eine gewisse, wohl nur äusserliche Übereinstimmung mit der *Hormogonale Gomontiella,* deren Fäden aus halbkreisförmig gebogenen Zellen zusammengesetzt sind. » Hollerbach, Kossinskaja and Poliansky write as follows : « above all, the longitudinal division of the cells is characteristic, by which it is sharply separated

Source MNHN Paris

from all previous genera » (translated from Russian), that is to say from the other genera of the family *Coccobactreaceae* Elenk.

Propagation (PASCHER : p. 351) : « nannoplanctont, wohl sekundër: auch in Schleim von Algen (ob angetrieben?). » It was found also in the Soviet-Union (HOLLERBACH, p. 57). « Seldom among algae in the nannoplankton. In the middle course of the river Viatka. » (Translated from russian).

2. *Gomonliella subtubulosa* Teodoresco (TEODORESCO : Sur le *Gomontiella* nouv. gen. de Schizoph. *Verh. Zool. Bol. Ges. Wien*, 51, p. 757, taf. 6. 1901). According to the author's description : the filament is longer (about 210 μ), erect, bluish-greenish-black. Slightly constricted at the septa, with a very thin hyalin sheath which can be seen after treatment with stain, e. g., safranin only. The thread which is bent into a tube is 19,8-24,2 μ broad. A cell is 2-2,7 μ long, its edges are curved inward. They may slide one under the other, meet, or be separated by a distance of not more than 2 μ. When spread out, it is 17-20 times as broad as long. The flattened apical cells are calyptra-like. No heterocysts and resting spores occur. TEODORESCO wrote about the multiplication : (p. 758) « La multiplication, a lieu seulement par hormogonies de longueurs variables, les plus courtes sont composées de trois cellules à peine, mais généralement, elles sont plus longues. Dans mes préparations j'ai pu voir souvent des filaments en voie de division transversale » (Fig. 7).

TEODORESCO assumes that the thread curves into a tube in order to protect itself against frequent desiccation, since in the capillary formed this way, water accumulates and is held for a long time.

The species *Gomontiella subtulosa* has not been previously found with the exception of the case recorded by TEODORESCO that we have mentoned.

3. *Gomonliella magyariana* nov. spec.
Description of the species see above.

4. *Gomontiella marthae* nov. spec.
Description of the species see above.

If we do not follow the opinion of HOLLERBACH and his fellow-authors, but that of GEITLER and we want to place the species in the scope of his system, the scheme of the order *Hormogonales* will be altered as follows :

Source MNHN Paris

Hormogonales, Wettstein

I. Threads with true branching (dichotomic, pseudo-dichotomic or side-branching). The threads often grow in several rows. The cells divide longitudinally and transversely. *Loriellaceae* Geitler, *Pulvinulariaceae* Geitler, *Capsosiraceae* Geitler, *Loefgreniaceae* Elenkin, *Nostochopsidaceae* Geitler, *Stigonemataceae* Geitler.

II. The threads are not branched, sometimes in two rows. The cells divide longitudinally and transversely. The edges of the threads are curved inward into tubes. There are no heterocysts. *Gomontiellaceae*, Elenkin (*).

III. The threads are not branched (sometimes pseudo-branching occurs), in one row. The cells divide transversely only. *Mastigocladaceae* Geitler, *Sokoloviaceae* Elenkin, *Rivulariaceae* Rabenhorst, *Scytonemataceae* Rabenhorst, *Leptobasaceae* Elenkin, *Microchaetaceae* Lemmermann, *Nostocaceae* Kützing, *Oscillatoriaceae* (Gray) Kirchner.

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(*) If GEITLER considered the absence of heterocysts as a decisive mark and followed it in his system, we should place the family after *Nostaceae* before *Oscillatoriaceae* Because of the primitive character of the division in two directions, it got a place after *Stigonemataceae*, to which family it is, in our opinion, not attached by any relationship. Since GEITLER, in opposition to the Soviet authors, does not attach much importance to the presence or absence of the heterocysts, it becomes evident that there are families in his system, e.g., the family *Rivulariaceae*, in which genera occur with and without heterocysts.

Source MNHN Paris

HOLLERBACH M. M. & KOSSINSKAJA E. K. & POLJANSKY W. I. — Sinesselenie wodorosli. — *Opredelitelj presnowodnich wodoroslej S.S.S.R.*, 2, Moskwa, 1953. (Bluegreen Algae : Determination Book of the Freshwater-Algae of the Sovietique Union. 1953. Moskau.)
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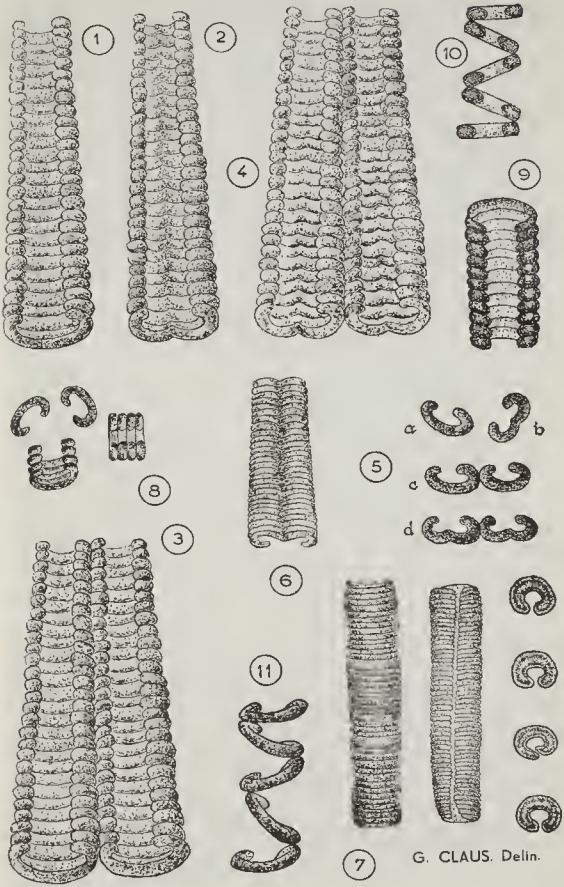
EXPLANATION OF PLATE

Fig. 1. — *Gomontiella marthae* n. sp. Part of a tubiform thread (× 1575).
» 2. — The same. Longitudinal division of the thread is visible. The constriction commences from the dorsal side (× 1575).
» 3. — The same. The two threads formed by the division have not yet separated (× 1575).
» 4. — The same. The two young threads have not yet separated, in their basal part, however, a further constriction has commenced (× 1575).
» 5. — The same. Process of division as seen in transverse section of the thread (× 785).
» 6. — The same. A thread in the process of dividing seen from the dorsal side (× 490).
» 7. — *Gomontiella subtubulosa* Teodorescu. The tubiform thread shown from dorsal and ventral side and in cross-section (× 785).
» 8. — *Gomontiella hamiformis* (Pascher) Claus. The tubiform thread and its transverse section (× 2360).
» 9. — *Gomontiella magyariana* n. sp. Part of the tubiform thread (× 1575).
» 10. — The same. Cells of the thread in extension with cells that meet with their alternate ends, in ventral view (× 1575).
» 11. — The same. In dorsal view, represented somewhat perspectivically (× 1575).

Source MNHN Paris

GENUS GOMONTIELLA



Source : MNHN, Paris

Albanian Algae collected by Giuseppe de Toni

By Francis DROUET

(New Mexico Highlands University, Las Vegas.)

■

While serving as captain in the Italian army of occupation in Albania in 1941, the late Dr. Giuseppe de Toni collected a number of algae, largely from fresh-water aquatic and terrestrial habitats, in the provinces of Vlonë, Berat, Tiranë, and Durrës. I am indebted to Dr. Anna de Toni for the privilege of studying these specimens, duplicates of which are on file in the Algarium de Toni at Brescia and in my personal herbarium.

Myxophyceae.

Anacystis montana (Lightf.) Dr. & Daily, *Butler Univ. Bot. Stud.* 10 : 221. 1952. — On wet substrata, Vlonë : Radhima, acqua di una fonte, *no. 65a*, 16 Jun.; Fushes-Dukati, roccia bagnata presso una sorgente, *no. 75*, 23 Jun.; Fushes-Dukati, pendici del Shendelliut, ca. 1000 M. s. l. m., grotta n. 1 (Stera e Vasos?), sulla parete superiore, umida, *no. 82*, 6 Jul.

Entophysalis rivularis (Kütz.) Dr., *Amer. Midl. Nat.* **30** : 671. 1943. — On wood, rocks, etc. in permanent bodies of water, Berat : Karbounara presso Lushnjë, corassa cornea di tartaruga palustre, presso la sorgente di H_2S, *no. 47*, 30 May. Vlonë : Fushes-Dukati, m. Shendelliut, velo d'acqua nella sorgente in cavitá naturale, *no. 81*, 6 Jul.

Amphithrix janthina (Mont.) Born. & Flah., *Ann. Sci. Nat. VII. Bot.* **3** : 344. 1886. — With *Entophysalis rivularis* in the specimens listed above from the provinces of Berat and Vlonë.

Dichothrix gypsophila (Kütz.) Born. & Flah., *ibid.*, **3**: 377. 1886. — On wet rocks etc., Berat : Paraboar-Lilai, in acqua corrente, 29 Apr.

Scytonema mirabile (Dillw.) Born., *Bull. Soc. Bot. Fr.* **36** : 155. 1889. — On rocks, soil, etc. wet with fresh water, Vlonë : Fushes-Dukati, roccia bagnata presso una sorgente, *no. 57*, 23 Jun.

Schizothrix rubella Gom., *Ann. Sci. Nat. VII. Bot.* **15**: 300. 1892. — On wet substrata, Vlonë : parete della galleria stradale, in velo d'acqua, *no. 84*, 20 Jul.

Source MNHN Paris

Schizothrix albaniensis, sp. nov. *Fila longa ramosa inter alias algas in stratum pannosum crustaceum calcareum aeruginеum invenientia, vaginis crassis lamellosis primum hyalinis aetate provecta interne vel omnino fuscescentibus, chlorozincico iodurato haud coerulescentibus; trichomatibus aeruginеis 4-5 μ crassis rectis vel flexuosis ad genicula non aut leviter constrictis ad apices longe attenuatis, intra vaginam singulis vel duobus vel tribus; cellulis diametro 1/2-3/4 brevioribus; protoplasmate granuloso; cellula apicali longe conica.* — Fig. 1. This new species of the section *Chroococcidiopsis* Gom. does not develop the very long and sharply pointed end-cells of *S. acutissima* Dr. Its sheaths are much firmer and more copiously developed than are those of the latter species. One specimen, the TYPE, with *S. albaniensis* developing in a stratum of *S. rubella* Gom. and *Phormidium autumnale* (Ag.) Gom., seen from Vlonë : parete della galleria stradale, in velo d'acqua, *no. 84*, 20 Jul.

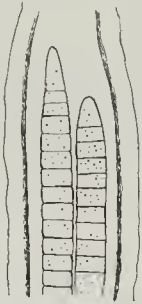


Fig. 1. — *Schizothrix albaniensis*, sp. nov., two trichomes within a sheath.

Hydrocoleum homoeotrichum Kütz., Phyc. Gen., p. 196. 1843. — On various substrata in flowing water, Vlonë : Brataj, letto di torrente in acqua a lento corso, *no. 3*, 18 Mar.

Microcoleus vaginatus (Vauch.) Gom., *Journ. de Bot.* 4 : 353. 1890. — It is probable that many, if not all, of the specimens listed below as *Phormidium autumnale* consist of trichomes of this species out of their sheaths. On soil, etc. wet intermittently by rains, Berat : Karbounara presso Lushnjë, in terra umida, *no. 26*, 13 May.

Microcoleus paludosus (Kütz.) Gom., *Ann. Sci. Nat. VIII. Bot.* 15: 358. 1892. — On wet soil, Berat : Lushnjë, in acqua di fosso a lento corso, *no. 32c*, 20 May.

Plectonema Nostocorum Born. in Born. & Thur., Notes Algol. 2 : 137. 1880. — On wet substrata, Berat : Karbounara presso Lushnjë, sponda asciutta di torrente, *no. 44*, 28 May.

Symploca muralis Kütz., Phyc. Gen., p. 201. 1843. — On intermittently wet soil, rocks, etc., Berat : Karbounara presso Lushnjë, *no. 28a*, 1 Jun.

Symploca dubia (Näg.) Gom., *Ann. Sci. Nat. VII. Bot.* 16 : 115. 1892. — In seepage on rocks, Vlonë : Fushes-Dukati, pendici del Shendelliut, ca. 1000 M. s. l. m., grotta n. 1 (Stera e Vasos?), sulla parete superiore, umida, *no. 82*, 6 Jul.

Source : MNHN, Paris

Lyngbya versicolor (Wartm.) Gom., *ibid.* **16** : 147. 1892. — On rocks, wood, etc., usually in flowing water, Berat : Karbounara presso Lushnjë, fosso d'acqua dolce corrente fra canne, *no. 21a,* 10 May.

Lyngbya Taylorii Dr. & Strickl. in Strickl., *Amer. Journ. Bot.* **27** : 631. 1940. — It is interesting to note this species, the sheaths of which become brillantly blue when treated with chlor-zin-iodine, growing so far from the western hemisphere, from which it has hitherto been reported. In shallow water, Berat : Paraboar-Lilai, in acqua corrente, *no. 14(15),* 29 Apr.; Karbounara presso Lushnjë, in sasso in acqua corrente, e corassa cornea di tartaruga palustre presso la sorgente di H_2S, *nos. 43, 47,* 28 & 30 May.

Phormidium foveolarum (Mont.) Gom., *Ann. Sci. Nat. VII. Bot.* **16** : 164. 1892. — On wet soil and rocks, Berat : Paraboar-Lilai, terra umida, su sasso, *no. 21,* 6 May.

Phormidium tenue (Menegh.) Gom., *ibid.* **16** : 169. 1892. — In shallow water, Berat : Karbounara presso Lushnjë, sorgente di acqua contenente notavole quantità di H_2S, *no 59,* 1 Jun. Vlonë : Jounfri, rivo d'acqua dolce presso il mare, *no. 68,* 17 Jun.

Phormidium valderianum Gom., *ibid.*, **16** : 167. 1892. — In shallow water, Vlonë : Fushes-Dukati, fosso di acqua corrente, *nos. 72, 80,* 21 & 28 Jun.

Phormidium subfuscum Kütz., Phyc. Gen., p. 195. 1843. — On wood, rocks, etc. in flowing water, Vlonë : Fushes-Dukati, letto del fiume Dukati, *no. 71,* 20 Jun.

Phormidium autumnale (Ag.) Gom., *Ann. Sci. Nat. VII. Bot.* **16** : 187. 1892. — On wet ground, wood, rocks, walls, etc. and in rain pools, Berat : Berat, città vecchia, muro umido, *no 50,* 31 May; Fieri, in terra umida e fosso asciutto, *nos. 63a, 64,* 14 Jun.; Karbounara presso Lushnjë, letto asciutto di torrente e in fosso, *nos. 38, 39, 45, 60,* 28 May & 1 Jun.; Lushnjë, in fosso e in terra umida sulla strada, *nos. 24, 52-56,* 12 & 31 May; Paraboar-Lilai, sulla terra umida, *no. 10,* 18 Apr. Durrës : Krujë, terra umida e piccolo fosso secco vicino al Convalescensiario presso Pengile, *nos. 87, 88,* 7 & 10 Oct. Tiranë : terra umida per scolo di acqua di fontana, Scuola S. Giorgio, *no. 85,* 22 Jul. Vlonë : Jounfri, in acqua dolce a lento corso in riva al mare, *no. 69,* 17 Jun.; Kriovero, parete della galleria stradale, in velo d'acqua, *no. 84a,* 20 Jul.; Radhima, acqua di una fonte, *no. 65a,* 16 Jun.

Phormidium uncinatum (Ag.) Gom., *Journ. de Bot.* **4** : 355. 1890. — On stones, wood, etc. in standing or moving water, Berat : Lu-

Source MNHN Paris

shnjë, in fosso, *nos. 22a, 25, 25a, 27, 34*, 12-28 May; Paraboar-Lilai, in cascatella e fontanile, *no. 16-18-20*, 29 Apr. & 5 May. Vlonë : Fushes-Dukati, fosso di acqua corrente, *no. 73*, 22 Jun.; Jounfri : rivo d'acqua dolce presso il mare, *no. 68*, 17 Jun.

Oscillatoria formosa Bory ex Gom., *ibid.* 4 : 356. 1890. — In shallow water and on wet ground, Durrës : Krujë, su terra umida vicino al Convalescensiario di Pengile, *no. 86*, 14 Sept.

Oscillatoria brevis (Kütz.) Gom., *Ann. Sci. Nat. VII. Bot.* 16 : 229. 1892. — On wet ground and in shallow water, Berat : Fieri, in terra umida nel campo sosta sulla strada di Apollonia, *no. 63*, 14 Jun.; Lushnjë, in terra umida e in acqua stagnante, *nos. 28, 30, 33, 46*, 13-29 May.

Oscillatoria chalybea Mert. in Jürg., Alg. Aq. Dulc. Dec. 13 : 4. 1822. — In shallow water, Berat : Karbounara presso Lushnjë, presso la sorgente di H_2S, *no. 58(26)*, 1 Jun.

Oscillatoria arliculata Gardn., *Mem. New York Bot.* Gard. 7 : 34. 1927. — See Dronet in *Amer. Journ. Bot.* 24 : 608. 1937. — In shallow water and on wet ground, Berat : Lushnjë, in acqua di fosso a lento corso, *no. 32b*, 20 May.

Rhodophyceae.

Asterocytis ornata (Ag.) Hamel, *Rev. Algol.* 1 : 451. 1924. — On moist substrata and in shallow water, Berat : Paraboar-Lilai, cascatella, *no. 16*, 29 Apr.

Bangia atro-purpurea (Roth) Ag., *Syst. Alg.*, p. 76. 1824. — *Canferva atro-purpurea* Roth, *Catal. Bot.* 3: 208. 1806. — In fresh-water streams near the sea, Berat : Paraboar-Lilai, 23 Apr.

Hildbrandtia prototypus Nardo, *Isis v. Oken* 1834 (1): 675. 1834. — On rocks etc. in shallow marine waters, Vlonë : Jounfri, in mare, presso la riva, fra gli scogli, *no. 67*, 17 Jun.

Heterokontae.

Vaucheria geminata (Vauch.) DC., Fl. Franç., ed. 3, 2: 62. 1815. — In seepage and in shallow water, Berat : Lushnjë, in acqua semi ground, Vlonë : Bahizza, *no. 5*, 19 Mar.

Vaucheria terrestris (Vauch.) DC., *loc. cit.* 1815. — On moist stagnante, *no. 31*, 20 May.

Source MNHN Paris

CHLOROPHYCEAE.

Protosiphon cinnamomeus (Menegh.) Dr. & Daily, *Butler Univ. Bot. Stud.* **12** : 159. 1956. *P. botryoides* (Kütz.) Klebs, Beding. d. Fortpfl.-Physiol. d. Nied. Org., p. 222. 1896. — On wet or damp soil, Berat : Karbounara presso Lushnjë, orlo di fosso umido, *no. 42*, 28 May.

Microspora stagnorum (Kütz.) Lagerh., *Ber. deutsch. bot. Gest.* **5**: 415-417. 1887. — In shallow water, Vlonë : Brataj, fossa d'acqua dolce a lento corso, *no. 1*, 18 Mar.

Stigeoclonium tenue (Ag.) Kütz., Phyc. Gen., p. 253. 1843. — On stones, wood, and larger plants in shallow, usually moving water, Berat : Karbounara presso Lushnjë, fosso d'acqua dolce corrente fra canne, *no. 21a*, 10 May.

Chlorotylium cataractarum Kütz., *ibid.* p. 285. 1843. — On stones etc. in shallow water, Berat : Lushnjë, in acqua di fosso a lento corso, *no. 32*, 20 May.

Rhizoclonium hieroglyphicum (Ag.) Kütz., Phyc. Germ., p. 206. 1845. — In shallow water, Berat : fosso d'acqua lentamente corrente, sulla umblattiera verso i baghetti ad Est di Lushnjë, *no. 35*, 23 May.

Cladophora glomerata (L.) Kütz., *ibid.* p. 212. 1845. — On rocks and other substrata in streams, Berat : Karbounara presso Lushnjë, in acqua corrente, *nos. 22, 40*, 9 & 28 May; Paraboar-Lilai, letto di torrente, in acqua corrente *nos. 12, 18a*, 23 & 29 Apr. Vlonë : Brataj, letto di torrente, sui sassi, *no 4*, 18 Mar.; Fushes-Dukati, greto del fiume Dukati, *no 76*, 23 Jun.; Radhima, velo d'acqua di una fonte, *no 65*, 16 Jun.

Spirogyra longata (Vauch.) Kütz., Phyc. Gen., p. 279. 1843. — In shallow water, Vlonë: Fushes-Dukati, letto del fiume Dukati, *no. 74*, 23 Jun.

Spirogyra Spreciana Rabenh., Alg. Sachs. 99-100 : 988 : 1860. — In shallow water, Berat : Lushnjë, in acqua di fosso a lento corso, *no. 32a*, 20 May.

Source MNHN Paris

Freshwater Algae of Sierra Leone

3. The Algae af Rakupr and Great Scarcies River

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■

The Great Scarcies River, alternatively known as the R. Kolenti, forms the frontier between Sierra Leone and « French Guinea » over most of its course, but the portion considered algologically here is the final section which flows completely within Sierra Leone territory. Over 60 years ago Dr. LEUDUGER-FERTMOREL examined two phials from the small ports of Mambolo and Tamalambo which he was unable to trace on maps available to him; he was under the impression they were close to Freetown, at the mouth of the Sierra Leone River, which is about 50 km. in a straight line from Mambolo. The gatherings proved to be rich, « une énorme quantité de débris de Diatomées à l'état tellement ténues qu'il est impossible de les déterminer ». From among this fragmentation he isolated specimens which he arranged in 215 taxa, of which 9 were described as new. The slides on which these were based are housed in the Muséum National d'Histoire Naturelle, Paris. In the preface to the whole work (LEUDUGER- FORTMOREL, 1898) in which the Sierra Leone diatoms were published, he pointed out that nothing was then known about the freshwater diatoms of West Africa: he forecasted that they would not differ materially from those known from other continents. Among all the « marine » diatoms he observed some species known to be of freshwater origin, but he made no comments about their special characteristics. It so happens that the Sierra Leone list was almost free from such a freshwater population, though a few brackish-water species were included.

The present authors commenced their survey of algal collections from Sierra Leone in 1950, the material being obtained through the kind services of government scientific officers stationed in various parts of the Colony and Protectorate. When the Rice Research Station was established for the British West African countries, it was centred at Rokupr on the Great Scarcies River, and we realised that it could only be a short distance from the villages whence Dr. LEUDUGER-FORTMOREL had received his material. The distance is about

Source MNHN Paris

12 km. upstream from Mambolo. A useful comparison is thus made possible betwen collections made 60 years apart. Kipimp and Kaikonki are also within this portion of the river, i.e. within the tidal reaches, and the material we have received from them were taken from the edges of rice-bearing swamps, whereas the Rokupr series of collections, amounting to 150 tubes gathered at all periods of the year, were obtained from the irrigation ditches and the experimental polders. In 1954, Mr. ADAMS made collections for us at Mambalo itself from brown sediments taken « 3 feet below High Water Mark and extending to Low Water Mark, in a tidal creek », possibly approximating to the type of collections made for LEUDUGER-FORTMOREL.

In presenting our own records we make a reservation that they are based on less than half of the material we have received; our primary concern had been to determine the seasonal and topographical variations in the abundant species in the various polders at the Rice Research Station. We had previously examined nearly a hundred collections made in the hinterland (WOODHEAD & TWEED, 1956, 1958), where we demonstrated a very rich flora of desmids, diatoms and blue-green algae along with representatives of other groups. The Rokupr collections provide a marked contrast, for though they are taken at least 25 km. from the river mouth, the Great Scarcies is still tidal. Hence there are mixtures of marine, brackish and freshwater diatoms the species tolerating saline conditions being most abundant. After reconciling LEUDUGER-FORTMOREL's nomenclature with that of later research, a matter embodied in our Check List (WOODHEAD & TWEED, 1958 a) we have noted 36 taxa common to his list and ours. We have noted algae that are listed in the pelagic records of SOUSA E SILVA along the Gulf of Guinea (1952/6, etc.). We propose 18 new species among a total of over 350, our lists including a few algae other than the diatoms.

It is at once apparent that we have found a preponderence of diatoms considered as brackish-water or freshwater, though among the latter are many which show remarkable tolerance. At Rokupr the salinity for most of the sites has been determined;

	Normality	p.p.m. Cl.
Sites 7 & 8, polder C.	0.0358 N.	1270
All other sites	0.0237 N.	840

« the higher figure inside the polder is at first sight surprising but it is probably due to the seepage of saline ground water under the bund and concentration by evaporation » (W. JACKSON in letter). At

Source MNHN Paris

the period, June, when these determinations were made the pH values at sites 7 & 8 were 2.8 to 3.6, the remaining sites varying between 5.6 and 6.3; the polder had been dug in February. The rice experimental area receives water shed from higher ground, which is lateritic, to the mud along the river, where tidal water mixes with it at least at the spring tides, e.g. at such tides polder C receives saline water. The climax of the saline period is reached in April. Variations in pH during the year on any one of the sites differ :

Site 1	pH 5.52 to 7.0	Site 7	pH 2.80 to 4.60
2	4.68 to 7.4	8	3.15 to 4.80
3	5.04 to 7.2	9	4.10 to 7.0
4	5.19 to 7.0	10	4.40 to 7.60
5	5.40 to 7.2	12	4.41 to 6.60
6	4.00 to 7.2	(Site 11 was not used)	

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SYSTEMATIC LIST

(presented in alphabetical order)

LF refers to plants appearing in LEUDUGER-FORTMOREL's list, 1898 for Mambolo etc.

W & T refers to plants appearing in our lists, the sample number appended indicating the reference to our Algal Collection. If no locality is specified, the record refers to Rokupr.

SS refers to recent records for Guinea Coast waters by SOUSA E SILVA.

ACHNANTHES

brevipes Ag. LF.

inflata (Ktz.) Grun. W & T (2366); has a wide distribution in West Africa.

Jacksonii sp. nova nobis, Rokpur (2288, site 6, May 1953 at pH about 6.0). Valves ovate with short produced ends, bluntly rostrate, 40 μ long, 13 μ wide. Raphe valve with narrow filiform raphe, axial area narrow, weakly widened around as the central area. Rapheless valve with a narrow pseudoraphe but no central area. Striation on both valves alike, faintly radiate, 11-12 in 10 μ, coarsely punctate, the puncta 12 in 10 μ. Named for W. JACKSON Esq., Botanist at the Rice Research Station. On account of the coarse striation this is a distinctive species. Fig. 3.

Source MNHN Paris

Valvae ovatae apicibus productis curtis, rostratis obtusis, 40 μ long., 13 μ lat. Rhaphevalva rhaphe recta filiforma, area axiali angusta, area centrali paene dilatata. Areovalva area axiali angusta sine area centrali; striis transapicalibus valvorum duorum similibus, 11-12 μ in 10 μ radiatis, punctis 12 in 10 μ.

lanceolata (Bréb. ex Ktz.) Grun. in Cl. & Grun., W & T.
.. *v. rostrata* (Östrup) Hust., W & T, also at Kipimp.
longipes Ag. LF : W & T : SS (at Dakar).
pusilla sp. **nova nobis,** Rokupr (2359, site 12, Dec. 1953, at pH about 6.0). Valves elliptical with broadly rounded ends, 14 μ long, 8.5 μ wide. Raphe valve with a broad transverse band reaching the margins sharply defined as a central area, the raphe filiform and straight in a very narrow axial area : striae about 20 in 10 μ, strongly punctate, vertical to the axial line. Rapheless valve also with a broad transverse band, rounded towards the central area, the pseudoraphe narrow; striae more than 20 in 10 μ, more finely and closely punctate than on the accompaning valve. This tiny diatom has the size and shape of *A. krypophila,* but a very different style of areas as well as the direction of the striae. Fig. 22.

Valvae ellipticae apicibus late rotundatae, 14 μ long, 8.5 μ lat. Rhaphevalva rhaphe recta et filiforma, area axiali angustissima dilatata fasciam latam usque ad marginem percurrentem formante, striis transapicalibus parallelibus circa 20 in 10 μ distincte punctatis. Areovalva area axiali angusta etiam fasciam latam, rotundata ad nodulum centralem; striis 20 in 10 μ punctatis delicatioribus et confertioribus.

ACTINOCYCLUS

Ehrenbergii Ralfs in Pritchard, LF, as *Actinoplychus septerarius;* W & T; SS (at Dakar).
.. *v. Ralfsii* (W. Sm.) Hust. in Rabh. (= *A. Ralfsii* (W. Sm.) Ralfs = *Eupodiscus Ralfsii* W. Sm.) LF : he found it well distributed on the west coast of Africa from Morocco to the mouth of the Congo. We have found it in other parts of of Sierra Leone, but not in the Great Scarcies River.
ellipticus Grun. in V. H., W &T.
subtilis (Greg.) Ralfs in Pritchard, LF; W & T.

ACTINOPTYCHUS

africanus Lend.-Fort., LF, the type locality.
campanulifer A.S., LF.
Heliopelta Grun. in V. H., LF.
mambolensis W & T 1958, LF (as *A. reticulatus* Leud.-Fort. 1898, an epithet already occupied by Pantocsek in 1886). The type locality is, of course, Mambolo.

Source MNHN Paris

mirans Leud.-Fort., LF, the type locality.
rotifer Leud.-Fort., LF, the type locality.
segmentatus Brun in A. S., LF.
splendens (Shadb.) Ralfs in PRITCHARD, LF : W & T at Rokupr, where frequent, Mambolo, Kaikonki and Kipimp.
undulatus (Bailey) Ralfs in PRITCHARD, including LEUDUGER-FORTMOREL's records of *A. areolatus* (Ehr.) A. S. and *A. senarius* Ehr. HUSTEDT (1955) indicated that *A. senarius* required to be placed under this epithet. LF; W & T at Rokupr, where frequent, Mambolo, Kaikonki and Kipimp. It is distributed all along the Guinea Coast. At Rokupr (2366, site 1, Jan. 1954 at pH 6.8), specimens were seen with a diameter of only 14 μ.

AMPHIPRORA

alata (Ehr.) Ktz., LF; W & T, also at Kaikonki.
paludosa W. Sm., LF : W & T at Kipimp only.
Temperei Cl., W & T at Kipimp only.

AMPHORA

bigibba Grun. in A. S., W & T (Rokupr, 2341) measuring 24 μ long, 11 μ wide, with 4 strongs ribs at the base of the constriction, all striae parallel, 24 in 10 μ. It has been recorded from Belgian Congo (Fig. 18).
coffeaeformis (Ag.) Ktz., LF : W & T at Rokupr and Kaikonki.
crassa Greg., LF : SS at Dakar and in the Gulf of Guinea.
exigua Greg., LF : recently found at Banana, Belgian Congo by KUFFERATH.
granulata Greg., LF.
macilenta Greg., LF.
marina (W. Sm.) V. H., LF. SS at Dakar and Portuguese Guinea.
pediculus (Ktz.) Grun. in A. S. W & T; it has an extensive distribution in West Africa.
proteus Greg., LF.
robusta Greg., LF.
salina W. Sm., LF.
turgida Greg., LF.

ANABAENA

Sterile filaments occur in some Rokupr polders.

ANOMOEONEIS

brachysira (Bréb.) Grun. in V. H. W & T. We agree with CHOL-

Source MNHN, Paris

NOKY that it cannot be considered as a northern-alpine diatom.
.. *f. thermalis* (Grun. in V. H.) A. Cl.-Eut., W & T.
exilis (Ktz.) Cl., W & T.
serians (Bréb.) Cl., *v. acuta* Hust., W & T at Kaikonki. CHOLNOKY recently (1957) reported this variety in Transvaal. It was originally described for Indonesia.

ASTEROLAMPRA
Grevillei (Wall.) Grev., LF : W & T at Kaikonki only.

AULACODISCUS
margaritaceus Ralfs in PRITCHARD *v. tenera* (Witt.) Ratt., LF as *A. africanus*.
Petersii Ehr., W & T, also at Kaikonki where frequent, and Kipimp. SS obtained one specimen off the Cape Verde Isles.

AULISCUS
africanus Leud.-Fort., LF, the type locality.

BACTERIASTRUM
hyalinus Laud., LF as *B. spirillum* Castr. SS records it for Portuguese Guinea and Dakar.
varians Laud., LF. This requires adding to our Check List for 2, 6, 20.

BIDDULPHIA
africana Leud.-Fort., LF, the type locality.
aurita (Lyngb.) Bréb. & Godey, LF : W & T at Rokupr, Mamholo, Kaikonki and Kipimp.
biddulphiana (J. E. Sm.) Boyer, LF as *B. pulchella* S. F. Gray. SS records for Portuguese Guinea and Senegal.
granulata Roper, LF : W & T at Kaikonki.
longicruris Grev., LF : W & T at Rokupr and Kaikonki. SS for for Senegal, Portuguese Guinea and « French » Guinea.
mobiliensis (Bail.) Grun. in V. H., LF as *B. Baileyi*. SS for Senegal, Portuguese Guinea and « French » Guinea, so that it likely to occur in Sierra Leone.
obtusa (Ktz.) Ralfs in PRITCHARD, LF. SS for Senegal and Portuguese Guinea.
polymorpha (Grun. in V. H.) Wolle, LF as *Ceratauluus polymorphus* Grun. in V. H. : W & T.
regina W. Sm., W & T.
rhombus (Ehr.) W. Sm., LF.

Source MNHN Paris

Tuomeyii (Bailey) Roper, LF. SS for Dakar and Portuguese Guinea.

CALONEIS

brevis (Greg.) Cl., LF. We have found it in other coastal districts of Sierra Leone.
formosa (Greg.) Cl., LF: W & T at Kaikonki and Kipimp. This is one of the diatoms noted for Sierra Leone by P. T. CLEVE.
latiuscula (Ktz.) Cl., LF.
permagna (Bailey) Cl., W & T. LF recorded it for Cameroons.

CAMPYLODISCUS

adriaticus Grun., LF.
Doemoelianus Grun. in A. S., LF as *C. Thuretii.*
Ralfsii W. Sm. *v. decorus* (Bréb.) A. Cl.-Eul., LF as *C. decorus.*

CAMPYLONEIS

Grevillei (W. Sm.) Grev., LF; W & T.

CAMPYLOSIRA

cymbelliformis (A. S.) Grun. in V. H. *v. producta* **var. nova nobis** (Rokupr, 2361), smaller than the type, 26.6 μ long, 5.6 μ wide with the ends finely produced and sub-capitate. Fig. 17.

Cellulis minoribus, 26.6 μ long., 5.6 μ lat., polis subcapitatis et delicate productis.

CERATAULUS

Smithii Ralfs in PRITCHARD, LF (also recorded as *Biddulphia radiata* Roper) : W & T : SS for Senegal.
turgidus Ehr., LF.

CHAETOCEROS

affinis Laud. LF as *C. Ralfsii* Cl., SS records it for Senegal.
borealis Bail. *v. Brightwellii* Cl., LF.
coarctatus Laud., LF. SS records for Senegal and Ivory Coast.
diadema (Ehr.) Gran, LF as *Syndendrium diadema.*
hispidum (Ehr.) Brightwell, LF.
paradoxus Cl., LF.

CHLAMYDOMONAS spp. occur at Rokupr.

CLIMACOSPHENIA

moniligera Ehr., LF.

Source MNHN Paris

CLOSTERIUM

rostratum (Ehr.) Ralfs, W & T.

striolatum (Ehr.) Ralfs, W & T.

COCCONEIS

disculus (Schum.) Cl., W & T at Mambolo and Rokupr.

.. *v. diminuta* (Pant.) A. Cl.-Eul. *f. multistriata* forma nova nobis. Rokupr (2366, site 1, Jan. 1954 at pH 6.8) and Kaikonki (2336, Dec. 1953). A form measuring 12.6-18.2 μ long, 8-9.8 μ wide, the striation radial and punctate, with twice the density on the raphe valve (about 25 in 10 μ) as on the rapheless valve (12 in 10 μ).

Forma 12.6–18.2 μ long., 8–9.8 μ lat. striis transapicalibus radialis punctatisque, in rhaphovalvam circa 25 in 10 μ, arcovalvam solus 12 in 10 μ.

pellucida Hantzsch in RABH., LF; SS records for Dakar.

pelta A. S., W & T. We have not seen any other records for Africa.

placentula Ehr., W & T; it has a wide distribution in the Guinea countries.

scutellum Ehr., LF : W & T at Kaikonki only. It occurs in most Guinea countries.

thumensis Mayer, W & T at Kipimp (2335, Nov. 1953) measuring 8.4 μ long, 7 μ wide, both valves having coarsely-punctate striae, 14 in 10 μ. CHOLNOKY recently recorded it for the Victoria Falls.

COSCINODISCUS

antiquus Grun. *v. lapponicus* A. Cl.-Eul. *f. multispinosus* A. Cl.-Eul., W & T; this seems to be the first African record.

argus Ehr., W & T at Kaikonki.

asteromphalus Ehr., W & T at Kaikonki; SS for Portuguese Guinea. Few African records exist.

.. *v. conspicuus* Grnn. in V. H., LF.

centralis Ehr., LF. SS has found all along the Guinea coasts.

curvatulus Grun., W & T at Mamholo only. SS records for Portuguese Guinea.

debilis Rattray, LF.

decipiens Grun. in V. H., LF : SS in Portuguese Guinea and Senegal.

decrescens Grun. in AS *v. genuinus f. minor* forma nova nobis Rokupr (2340, site 8, Dec. 1953 at pH 4.0). Only half the diameter of the type, 17 μ, areolae 2 in 10 μ in the middle, a central field present.

Source MNHN Paris

Cum area centrali, in medio areolis 2 in 10 μ; diametro solus dimidio v. genuino, 17 μ.

.. *v. repletus* Grun., W & T, also at Rokupr (2399, site 7, Dec. 1953) of small diameter, 24 μ, without a central field, the areolae 4 in 10 μ.

We have not seen African records for *C. decrescens* taxa.

diplostictus Grun. in V. H., LF.

excentricus Ehr., LF; W & T in most of the Rokupr gatherings, also at Mambolo and Kipimp. SS for most Guinea countries.

gigas Ehr., LF.

granulatus Ehr., W & T.

kryophilus Grun. (*C. excentricus v. fasciculata* Hust. in Rabh., 1930) W & T. It occurred in Zanon's West African material.

lineatus Ehr., LF : W & T in most gatherings at Rokupr, also at Mambolo; SS for Guinea Coast countries.

marginatus Ehr., W & T at Kipimp only. LF reported it for the Congo delta.

micans A. S., LF.

nitidulus Grun. in A. S., W & T.

nitidus Greg., LF; W & T; SS for Senegal and Ivory Coast.

nodutifer A S., LF; W & T.

obscurus A. S., LF.

ocutus-iridis Ehr., LF : W & T : SS gives as general in Guinea Coast countries.

pectinatus Rattray, LF.

pellucidus Grun. in V.H., LF.

perforatus Ehr., LF : SS found for Senegal and Ivory Coast.

radiatus Ehr., LF : W & T, frequent at times at Rokupr and Mambolo, also seen at Kaikonki and Kipimp. At Kipimp (2335) a form 93 μ diameter, the margin not striate and no umbilicus (Fig. 2). SS gives for Senegal and Portuguese Guinea.

COSMARIUM

subcrenatum Hantzch in Rabh., W & T in one gathering from Rokupr (site 1).

CYCLOTELLA

antiqua W. Sm., W & T at Rokupr (2293, July 1953), a form 14-15 μ in diameter.

comta (Ehr.) Ktz., LF : W & T, frequent in one Rokupr site (10). It is said to prefer highly eutrophic waters in the tropics.

Source MNHN Paris

Kuetzingiana Thwaites, W & T, frequent in most gatherings from Rokupr, save site 10 where the previous species is common. Also frequent at Mambolo.

pelagica Grun., LF.

stelligera (Cl & Grun. in Cl.) Cl. & Grun. in V. H., LF : W & T. SS has recorded for Senegal.

stylorum Brightwell, LF. The type locality was from Sierra Leone (Q.J.M.S., 8, plate 6, fig. 16).

CYMATOSIRA

belgica Grun. in V. H., W & T at Rokpr (2293) a form measuring 24 μ long, 5 μ wide, the obtuse poles evenly rounded. Central field linear (in the type it is lanceolate). Striation 12-14 in 10 μ, distinctly punctate, puncta 10 in 10 μ, with puncta over the ends of the poles.

Lorenziana Grun., LF.

CYMBELLA

amphicephala Nag. in Ktz., W & T.

cuspidata Ktz., W & T.

javanica Hust., W & T : though known in S. Africa, we have not seen W. Africa, records for this pan-tropical diatom.

naviculiformis (Auersw. in Rabh) Auersw. in Kirchn., W & T.

punctata **sp. nov. nobis,** Rokupr (2288). Valves broadly elliptical with rostrate poles, the dorsal side more convex, 17.5 μ long, 11 μ wide. Raphe straight, the central pores sharply bent ventrally. Axial area narrow scarcely widened into a central area. Transapical striation strong, 15-16 in 10 μ, radial throughout and strongly punctate, almost beaded, with one or two shorter striae among longer ones in the middle. Fig. 21.

Valvae late ellipticae paullo asymmetricae ad apices rostratae obtusatae, 17.5 μ long., 11 μ lat., margine dorsali plus convexa quam ventralem. Rhaphe recta poris centralibus marginem ventralem inclinatis, area axiali angusta sed non in medio dilatata. Striis transapicalibus radiantibus validis, 15-16 in 10 μ, valde punctatis paene margaritatis, in media parte compluribus brevioribus intercalatis.

Dusenii Cl., LF.

DIATOMA

maximum (Perag.) Grun. in A. S., W & T.

DIMEROGRAMMA

fulvum (Greg.) Ralfs in Pritchard, LF.

minus (Greg.) Ralfs in Pritchard, LF.

.. *v. nanum* (Greg.) V. H. & Grun. in V. H., LF.

Source MNHN Paris

DIPLONEIS

Adonis (Brun) Cl. *v. oamurensis* Cl., LF.

Bombus (Ehr.) Ehr., LF. SS records for Guinea Coast countries.

Crabro (Ehr.) Ehr., LF.

didyma (Ehr.) Ehr., LF; W & T, also at Kaikonki. The only other African record is for Egypt in 1958.

elliptica (Ktz.) Cl., LF.

exemta (A. S.) Cl., LF.

fusca (Greg.) Cl., W & T.

.. *v. pelagi* (A. S.) Cl., LF.

gemmatula Grun. *v. lacrymans* (A. S.) Cl., LF.

Gruendleri (A. S.) Cl., LF.

oblongella (Näg. in Ktz.) Cl., LF.

.. v. ovalis (Hilse in Rabh.) Ross in POLUNIN, W & T, also at Kipimp.

splendida (Greg.) Cl., LF.

.. *v. puella* (A. S.) Cl., LF.

Weissflogii (A. S.) Cl., LF : W & T, not uncommon at Rokupr and also seen at Kipimp.

ENTOPYLA

australis (Ehr.) Ehr., W & T.

EPITHEMIA

turgida (Ehr.) Ktz., *v. granulata* (Ehr.) Brun, LF.

EUGLENA

mutabilis (Klebs) Schmitz *v. Mainxii* Gojdics, W & T at Rokupr (2295, site 7, Aug. 1953 at pH 4.1), 42 μ long, 5.5 μ wide, comparable with the illustrations of material from Iowa. Fig. 25.

EUNOTIA

angustata (Grun.) Berg, W & T.

arcus Ehr., W & T at Rokupr and Mambolo.

.. *v. minor* Grun. in V. H., W & T, at Rokupr (2295, site 7 at pH 4.5), measuring only 17.5 μ long, 3.5 μ wide.

curvata (Ktz.) Lgst., It seem necessary to comment on the usage of this name, for Ross unfortunately only gave the baldest of references when he used it in his work. After comparison of the illustrations and citations in numerous works it can be established that there are two diatoms mixed up in the welter of synonyms, yet readily referable to original texts.

Source MNHN Paris

Synedra lunaris Ehrenberg 1831
Exilaria curvata Kützing 1834

It is also clear that the RABENHORST specimens do not conform to the EHRENBERG specimens (illustrations and description) of his *Synedra lunaris;* if they did, then his usage of *Eunotia lunaris* would have preceded that of GRUNOW. GRUNOW, however, illustrated the EHRENBERG plant, which shows attenuation of the valves, not the parallel margins characteristic of *Exilaria curvata.* When ROSS considered the case it seems that he chose the later-derived epithet, when accepted usage states that the oldest valid epithet must be used; similarly a new epithet should have been coined for the RABENHORST plants. It is quite clear that the plants based on RABENHORST must be expunged from records of *Eunotia lunaris,* and it must be confessed that all records of *E. lunaris* and *E. curvata* become suspect, unless their real shape is illustrated or described.

diadema Ehr., W & T.

.. *v. tetraodon* (Ehr.) A. Cl.-Eul., W & T.

flexuosa (Bréb.) Ktz., W & T at Rokupr and Mambolo. It has been seen in most Guinea Coast countries.

lineolata Hust., W & T in most Rokupr collections, and also seen Mamholo. In sample 2292, July 1953, some specimens showed weakly undulate sides, 142 μ long, 4.5 μ wide, the striae 15 in 10 μ, the marginal puncta 7-8 in 10 μ.

.. *f. minor* forma nova nobis, at Rokupr, sample 2293, July 1953 and other samples. A small form, only 39-66 μ long, 5-6 μ wide, the marginal puncta 7-8 in 10 μ. This form is not uncommon.

Forma minor, 39-66 μ long., 5-6 μ lat. punctis marginalibus 8-7 in 10 μ.

margaritala sp. nova nobis, Rokupr (sample 2288, site 6, May 1953). Valves with a straight ventral margin and a moderately tumid dorsal margin, the poles very slightly curved ventrally, neither produced nor capitate, evenly rounded. 33 μ long, 4-6 μ wide. On the dorsal side the striae are strong and distant, 5 in 10 μ, but the striation does not reach the ends where there is a zone without sculpture around the raphe ends, which reach the mid-point of the valve. On the ventral side the striae are delicate and much denser, about 18 in 10 μ, also leaving the polar parts free. The pseudoraphe is narrow. Strong blunt knobs project above the dorsal surface in between the striae, which also project as firm, though much thinner, spines above the margin. This dorsal ornament is not continued over the hyaline part of the valve. Fig. 24.

Source MNHN Paris

An unusual diatom structure makes the affinities difficult to trace, even among the *Desmogonium* section of *Eunotia* species.

Valvae margine ventrali recta margine dorsati modice tumida, apicibus lenissime curvatis ad ventrem nec productis nec capitatis, aequaliter rotundatis, 33 μ long., 4.6 μ lat. Dorso striis transapicalibus validis et distantibus, 5 in 10 μ; ventro striis densioribus delicatisque, circa 18 in 10 μ, ad poles absunt. Rhaphe ad mediam superficie sitae, pseudorhaphe angusta. Baltis obtusis validisque inter striis dorsalibus proiectis sunt, etiam striis instar spinarum gracilium sed firmarum proiectis.

monodon (Ehr.) Ehr., W & T.

.. *v. tropica* (Hust.) Hust. in A. S. W & T at Rokupr and Kaikonki.

pectinalis (O.F.M.) Rabh., W & T at Rokupr and Mambolo. Not common; it has been reported for most Guinea Coast countries.

.. *v. cristula* Berg, W & T at Kipimp.

.. *v. minor* (Ktz.) Grun. *f. impressa* (Ehr.) Hust. in PASCHER, W & T.

.. *v. undulata* (Ralfs) Grun. in RABH., W & T at Kaikonki.

polyglyphis Grun. in V. H., W & T.

robusta Ralfs in PRITCHARD. W & T; it is an unusual diatom in Africa. In West Africa a record for « French » Guinea is known.

triodon Ehr., W & T. In PRITCHARD there is an entry for « Africa », otherwise we have no other record for the continent.

veneris (Ktz.) De Toni, W & T at Rokupr and Kaikonki. It is known for most Guinea Coast countries.

EUNOTOGRAMMA

laeve Brun. in Cl. & Möller. LF.

FRUSTULIA

interposita (Lewis) De Toni, W & T at Rokupr. LEWIS's type specimen came from Sierra Leone.

Lewisiana (Grev.) De Toni, LF : W & T.

rhomboides (Ehr.) De Toni, W & T, frequent in many of the Rokupr collections, also at Kipimp and Mambolo. It is frequent in Guinea Coast countries.

.. *v. Huberi* Meister in HUB.-PEST., W & T at Rokupr (2291, site 9, and 2290, site 8, in June 1953, pH 3.2-6.6), broader than usual, 52-54 μ long, 7-9 μ wide.

saxonica Rabh. 1852 Pfitz. in HANSTEIN, W & T, abundant in most collections from Kipimp, Mambolo and Rokupr.

.. *v. capitata* A. Mayer, W & T at Rokupr and Mambolo,

Source MNHN Paris

sometimes in quantity. This seems to be the first record for African countries.

.. *f. undulata* (Hust. in PASCHER) A.-Cl.-Euler, W & T. In Africa it seems to be recorded only for the Guinea Coast countries.

suspecta (Freng.) **comb. nov. nobis** *v. obtusa* (Freng.) comb. nov. nobis (required for *Vanheurckia suspecta* Freng., 1934 and its *variety obtusa* Freng. 1934 respectively); W & T at Rokupr (2292, July 1953), shorter than hitherto recorded, 32.2 μ long, 11,5 μ wide, otherwise the same. This seems to be the first African record.

vulgaris (Thwaites) De Toni, W & T, frequent at times at Rokupr, also found at Mambolo.

marinum (W. Sm.) H. Perag. in PERAG. & PERAG. W & T. LF. A discussion of the nomenclature appeared in HUSTEDT (1954) as a consequence of which its identity with *Smithiella marina* (W. Sm.) H. Perag. & M. Perag. makes the entry under the latter name in our Check List unnecessary. LEUDUGER-FORTMOREL refers to the species as *E. debilis*.

Weissei Ehr., W & T.

FRAGILARIA

construens (Ehr.) Grun., W & T.

leptostauron (Ehr.) Hust. in RABH. *v. slauroneiformis* **var. nova nobis**, Rokupr (sample 2280). None of A. CLEVE-EULER's drawings for the species show an interruption of striation in the inflated part which is a striking character of the new variety, 15.8 μ long, 6.5 μ wide, striae 10 in 10 μ. Fig. 23.

Striis transapicalibus 10 in 10 μ ad inflationem distincte interruptis, 15.8 μ long., 6.5 μ lat.

pinnata Ehr., W & T.

rumpens (Ktz.) Carlson, W & T.

.. *v. fragilariodes* (Grun. in V. H.) A. Cl.-Eul., W & T at Kipimp.

GOMPHOCYMBELLA

sierra-leonensis **sp. nova nobis**, Kipimp (sample 2335, Nov. 1953). Generally cymbelloid about the longitudinal axis but the one valve is slightly more convex than the other making the lower pole more slender than the upper pole : both poles are rostrate, 32.6 μ long, 12.1 μ wide. Axial area central and straight, narrow, without any broadening into a central area. Striae almost parallel throughout.

Source MNHN Paris

Valvis cymbelloidis polis rostratis, polo inferiore quam superiore graviore; margine uno quam alteriore convexiori 32.6 μ long., 12.1 μ lat. Area axiali recta et centrali, angusta circum nodulum centralem non dilata; striis fere parallelis.

This new species can be compared with ZANON (Kivu, pl. I, fig. 35) where the slight asymmetry of *G. Beccarii* Grun. at a casual glance gives the impression of a poor drawing of a symmetrical alga. Our plant differs in the parallel strong striae.

GOMPHONEMA

lanceolatum Ehr., W & T.

olivaceum (Lyngb.) Ktz., *v. balticum* Cleve *f. dubium* A. Mayer. W & T at Rokupr, July 1953; length 23 μ, breadth 6.5 μ, the striae 17 in 10 μ, the two median on each side much shorter than the rest, vertical to the median line and distant from the remaining striae which are strongly radial, almost vertical at the poles. The central area is hour-glass shaped by reason of these striation variations. No African records exist for this form. Fig. 20.

parvulum Ktz., W & T.

GOMPHONITZSCHIA

Ungeri Grun., W & T at Rokupr (site 6, May 1953, pH 6.0), measuring 35-43.4 μ long, 4-4.5 μ wide at the top pole, carinal puncta 9 in 10 μ.

GRAMMATOPHORA

macilenta W. Sm., LF : SS records it for Senegal.

marina (Lyngb.) Ktz., LF : SS records it for Senegal.

maxima Grun., LF.

GYROSIGMA

attenuatum (Ktz.) Rabh., W & T at Rokupr, Kaikonki and Kipimp, frequent in the last two localities.

balticum (Ehr.) Rabh., LF: SS records for Portuguese Guinea.

.. *v. maximum* (Grun.) W & T, LF.

.. *f. minor* as a *Pleurosigma;* LF: we are still unable to trace the authority.

We have found other varieties of *G. balticum* in Sierra Leone.

curvulum (Ehr.) Rabh., LF.

distortum (W. Sm.) Griff. & Henf., W & T; a record for Cameroons exists.

fasciola (Ehr.) Cl., W & T, not uncommon at Rokupr.

rectum (Donk.) Cl., W & T at Mambolo, not uncommon.

Source MNHN Paris

scalprioides (Rabh.) Cl., W & T, not rare at Rokupr and Mambolo. LF recorded it for Dakar, and P. T. CLEVE gave it for Cameroons.

HANTZSCHIA

amphioxys (Ehr.) Grun. in CL. & GRUN., W & T; occurs in most Guinea Coast countries.

HEMIAULUS

longispinosus sp. nova nobis, Rokupr (2346, site 4) differs from other species in having a strong firm, though slender, spine arising midway between the two arms and equal to them in lenght (ca. 30 μ). The arms finely granulate but not spinose at the tips, the body delicately punctate in close oblique rows. Fig. 13.

In other species when spines are present between the arms they are extremely short, and usually more than one. LEUDUGER-FORTMOREL presents a whole page of illustrations of West African specimens, none of which compare our plant.

Spina firma melius inter brachia, aequilonga brachia circa 30 μ. Brachia granulatis delicatis sed non ad apices spinosis. Cellulis in seriebus densis obliquis punctatis delicatis.

HEMIDISCUS

cuneiformis Wall. *v. gibba* (Bail. ex Ralfs in PRITCHARD) Hust. in RABH. (= *Euodia gibba*). Quite frequent at Kipimp and Kaikonki.

Weissflogii (Grun. in V. H.) Hustedt (including *Euodia Rataboulii*) LF; W & T at Rokupr and Mambolo, often present though seldom in great quantity. We have a pH note of 6.0 for it at Rokupr.

HYALODISCUS

stelliger Bail., LF as *Podosira maculala*. SS gives for Portuguese Guinea.

subtilis Bail., W & T.

ISTHMIA

enervis Ehr., LF.

MASTOGLOIA

apiculata W. Sm., LF.

erythraea Grun., LF.

Source MNHN Paris

Jelineckii (Grun.) Grun. *v. marina* (Jan. & Rabh. in RABH.) Cl., LF.
Smithii Thw. ex W. Sm., LF : SS gives for Senegal.
splendida (Greg.) Cl., LF.

MELOSIRA

arenaria Moore, LF. as *M. hispida*.
distans (Ehr.) Ktz., W & T at Rokupr and Mambolo, with status α at Rokupr. A mount prepared in arsenic selenide showed the teeth to be obtusely rounded.
granulata (Ehr.) Ralfs in PRITCHARD, LF : W & T (status α and γ) Fréquent in the Guinea Coast countries.
hormoides Mont., W & T.
italica (Ehr.) Ktz., W & T at Kaikonki and Kipimp.
Montagnei (Ktz.) Lagerst., W & T : SS found it in Senegal.
nummuloides (Dillw.) Ag., W & T : SS found it in Senegal.
varians Ag., W & T.

MICROSPORA

Loefgrenii (Nordst. in Wittr. & Nordst.) Lagerh., in one polder at Rokupr.

MOUGEOTIA filaments also occur in some of the Rokupr polders.

NAVICULA

brasiliensis Grun., LF.
cryptocephala Ktz., W & T at Rokupr and Kipimp.
.. *v. veneta* (Ktz.) Rabh., W & T at Rokupr and Mambolo. Relatively few records are known for the Guinea Coast countries.
directa (W. Sm.) Ralfs in PRITCHARD, LF.
distans (W. Sm.) Ralfs in PRITCHARD, LF.
elegans W. Sm. *v. Smithii* A. Cl.-Eul., W & T at Rokupr (sample 2281) measuring 85-87 μ long, 22.5-27.5 μ wide. The variety is the type as depicted by W. SMITH.
forcipata Grev. *v. suborbicularis* Grun. in V. H., W & T at Rokupr (2291, site 9, June 1953 at pH 6.5 to 7.0) measuring 18 μ long, 16 μ wide, the striae 14 in 10 μ, thus conforming with the description given by P. T. CLEVE.
gastrum (Ehr.) Ktz., W & T at Mambolo.
.. *v. Hambergii* (Hust.) A. Cl.-Eul., W & T.
gracilis Ehr., W & T.
Hennedyi W. Sm. LF : SS records for Senegal.
.. *v. manca* A. S. LF.

Source MNHN Paris

humerosa Bréb. ex W. Sm., LF; old records exist for West Africa and SS has recently recorded it for Senegal.

inflexa (Greg.) Ralfs in PRITCHARD, LF.

kaikonkiensis **sp. nova nobis**, Kaikonki (2336, Dec. 1953), valves lanceolate with gently-produced poles, 18.6 μ long, 6.5 μ wide. Raphe filiform and straight, the axial area very narrow without a discernable central area. Striae slightly radial, 18 in 10 μ, the produced poles having a distinctive shadow line. Fig. 10.

Valvae lanceolatae apicibus leniter productis, 18.6 μ long., 6.5 μ lat. Raphe recta filiformis, area axiali angustissima circum nodulum centralem non dilatata. Striis transapicalibus tenuiter radiantibus, 18 in 10 μ, linea opaca ad polos.

kolentiensis sp. **nova nobis**, Rokupr (2281, March 1953), valves lanceolate-elliptical with obtusely produced rostrate ends, 52 μ long, 22.2 μ wide. Raphe straight, axial area very narrow, almost obsolete, the central area small and almost circular about the centre of which there is a welldefined stigma. Striae 14 in 10 μ, slightly radial in the centre where there are some short striae among longer curving striae, all striae distinctly punctate. Fig. 15.

It has a superficial resemblance with *N. exiguiformis* Hust. which is much smaller and has lineolate striae; in the group of *Punctatae* the new species is nearest to *N. Galickii* where there is no stigma.

Valvae lanceolatae-ellipticae apicibus rostratis et obtuse productis, 52 μ long., 22.2 μ lat. Raphe recta, area centrali angustissima fere obsoleta, area centrali parva et fere rotundata prope mediam puncto valido et solitario. Striis transapicalibus punctatis, 14 in 10 μ, in media parte leniter radiantibus compluribus brevioribus intercalatis.

lyra Ehr., W & T., SS records for Dakar.

peregrina (Ehr.) Ktz. *v. kefvingensis* (Ehr.) Cl., W & T at Rokupr (2293, July 1953). This variety has recently been found by CHOLNOKY in Transvaal.

plicata Ehr., LF.

praetexta Ehr., LF.

pupula Ktz., W & T; it is known for most Guinea Coast countries.

.. *v. mutata* (Krasske) Hust. in PASCHER, W & T.

pusilla W. Sm., LF. The only recent record for West Africa is for Nigeria.

pygmaea Ktz., W & T at Rokupr and Kipimp; at Rokupr (2340, site 8, Dec. 1953 at pH 4.0), measuring only 18 μ long, 10 μ wide, the striae 21 in 10 μ.

Source MNHN Paris

quadripartita Hust. in A. S., W & T at Rokupr (2292, July 1953), measuring 19 μ long, 8.5 μ wide. CHOLNOKY has recently equated this species with *N. Hambergi* (vide *N. gastrum v. Hambergii* supra).

radiosa Ktz., W & T. There are few records for other Guinea Coast countries.

.. *v. tenella* (Brêb. ex Ktz.) V. H., W & T at Rokupr and Kaikonki. We have only noted a record for Ivory Coast.

Ruttneri Hust., W & T, Rokupr (2281), measuring 29.5 μ long, 7.5 μ wide, somewhat larger than generally quoted.

seminuloides Hust., W & T, Rokupr (2280, site 1, March 1953 at pH 6.0). A small diatom measuring only 9 μ long, 5 μ wide, the central area reaching the margins. The type is known from Tunisia and South Africa. In the *var. sumatrensis* Hust., known for the Belgian Congo, the fascia of the central area is bounded by short striae.

spectabilis Greg., W & T.

.. *v. bullata* Cl. *f. Moelleriana* (Jan. in A. S.) Cl., LF.

.. *v. emarginata* Cl., W & T. The only previous record for Africa known to us is one by DEBY for Sierra Leone.

subhalophila Hust., W & T at Rokupr (2280, site 1, March 1953 at pH 6.0) measuring 35 μ long, 9 μ wide, slightly longer than HUSTEDT gave for the Sumatran specimens. Striae parallel, at least 30 in 10 μ.

subtilissima Cl., W & T. Few African records exist and they are from widely-separated countries.

Zosteretii Grun., LF.

species nova nobis, at Rokpr (2291, site 9, June 1953 at pH about 7.0). This is based on a fragment showing a produced rostrate end, linear with the central part probably parallel sided. We estimate the full length to be about 36 μ, the width is 11 μ. Striae radial, 14 in 10 μ, the central striae more distant and shorter so that a vague central area is left; all the striae are punctate. Axial area narrow, the raphe clefts at the pole distinct. Fig. 11.

It has some appearance of *N. peregrina* but a strong punctation replaces lineolation.

NEIDIUM

amphigomphus (Ehr.) Pfitz. in HANST., W & T, at times in quantity.

amphirhynchus (Ehr.) Pfitz. in HANST., W & T.

dilatatum (Ehr.) Pfitz. in HANST., W & T. at Rokupr and Mambolo.

Source MNHN Paris

.. *v. intermedium* A. Cl.-Eul., W & T at Rokupr (2342, site E, Dec. 1953) with sides parallel in the middle, 53 μ long, 22 μ wide; striae almost parallel in the middle.

gracile Hust. f. *aequale* Hust., W & T at Rokupr (2280, site 1, March 1953, at pH 6.0). The measurements of these specimens are 39 μ long, 12 μ wide.

Kozlowii Meresch. *v. sierra-leonensis* var. nova nobis, Rokpur (2293, July 1953). The ends of the cell are conical, 42 μ long 10 μ wide. Raphe slightly oblique from the median longitudinal line, the central clefts strongly inclined in opposite directions. Axial area very narrow, the central area quadrate and small. Striae markedly oblique and punctate, 18-19 in 10 μ. This variety is nearest to *v. moniliforme* A. Cl.-Eul. Fig. 6.

Valvae 42 μ long., 10 μ lat., apicibus conicis. Raphe parum obliqua, poris centralibus in contrarias directiones recurvatis; area axiali angustissima, centrali quadrata et parva. Striis transapicalibus valide obliquis punctatisque, 18-19 in 10 μ.

NEONEMA

quadratum Pascher, W & T at Rokupr (2340, site 8, Dec. 1953, at pH 4.2). This is a *Geminella*-like member of the Xanthophyta, lacking starch. Cells quadrate, wider than described before, 16-17 μ instead of 9-11 μ. It has been found in Tatra and Vorarlberg in Europe, also in British Columbia.

NITZSCHIA

acicularis (Ktz.) W. Sm., W & T.

acula Hantzsch in Cl. & Grun., W & T. This species has been frequently referred to with a supposed correction to *N. acuta*. In the original diagnosis (Arctic Diatoms, p. 90) it is written *N. acula*, and there is a *N. acuta* Cleve described on page 75, a different diatom originally described from the West Indies. For our plant (which has also been described for French Soudan) Hustedt (1954) has correctly pointed the way with *N. acula*, and there is a thorough discussion of the usage of the epithets by A. Mayer (1946).

antillarum (Cl.) Meister. Lanceolate with long tapering poles, very sharply pointed, 36.5-46.5 μ long, 7-8 μ wide. Transapical striae prominent, about 18 in 10 μ. Fig. 19.

This diatom has some resemblances to *Denticula Dusenii* but its acute poles are very distinctive. It seems to occur freely in the Great Scarcies River (Rokupr, 2281, 2288, 2292, 2294, 2295 and 2366 ; Mambolo 2352 and Kaikonki 2336), throughout the year, the pH usually about 6.0. Hendey found this

Source MNHN Paris

diatom less common in the material he studied from Freetown than elsewhere in West Africa.

Brightwellii Kitt. ex Pritchard *v. pustulata* Brun, LF.

calida Grun. in Cl. & Grun., LF.

.. *v. satinarum* (Grun.) Freng., LF. This should be added to the Check List, for 6 and 20.

capitellata Hust. in A. S., W & T.

congotensis Hust., W & T at Rokupr (2288, site 6, May 1953, at pH 6.0) measuring 142 μ long, 6.5 μ wide, the carinal puneta 8 in 10 μ.

constricta (Ktz.) Ralfs in Pritchard, LF., who gave the authority as (Ralfs). He also listed it for the Prince Isles and St. Thomas Isles in the Gulf of Guinea. A change of epithet is desirable on the grounds of confusion, for Ralfs derived his species from *Synedra constricta* Ktz. 1844, the specimens now being identified as *N. apiculata*. In 1862, Grunow transferred another diatom, *Tryblionella constricta* Greg. 1855 to *Nitzschia* as *N. constricta* (Greg.) Grun. It seems preferable to place such Nitzschias based on Ralfs to a new combination, for which we propose *Nitzschia Ralfsii* **nom. nov.**

Denticula Grun. in Cl. & Grun., W & T.

dissipata (Ktz.) Grun., W & T at Rokupr and Mambolo.

distans Greg., W & T at Mambolo.

elliptica Hust., W & T at Rokupr (2293, July 1953), measuring 14 μ long, 6 μ wide; striae 18 in 10 μ. It has been recorded only for the Belgian Congo.

epithemoides Grun. in Cl. & Grun., W & T at Mambolo.

filiformis (W. Sm.) Schütt in Engler, W & T.

.. *v. ignorata* (Krasske in Pascher) A. Cl.-Eul., W & T, frequent in polder 10 at Rokupr.

flexa Schumann, W & T.

fonticola Grun. in V. H., W & T.

frustulum (Ktz.) Grun. in Cl. & Grun., *v. perpusilla* (Rabh.) Grun in V. H., W & T.

granulata Grun. in Cl. & Möller. A diatom we consider here occured at Rokupr (2291, site 9, June 1953 at pH 6.5-7.0) measuring 21.3 μ long, 10 μ wide, with 9 rows of puncta in 10 μ. Also at Rokupr (2361, site 5, Dec. 1953 at pH 7.0) measuring 35 μ long, 12 μ wide with 5 rows of strong puncta in 10 μ comparing closely with Pantocsek's illustration of *Zotheca Csaozkaae* (1902, fig. 250) which became *N. granulata*. There is a resemblance too with *N. compressa* LF noted similar plants for Cameroons.

Source MNHN Paris

Heufleuriana Grun., LF.

invicta Hust., W & T at Kipimp (2335, Nov. 1953), somewhat large 43 μ long, 7.5 μ wide, but otherwise agreeing in shape.

lanceolata W. Sm. *f. minor* V. H. & Grun. in V. H., W & T at Rokupr (2342, polder E, Dec. 1953) measuring 42 μ long, 5.6 μ wide, the carinal puncta 7 in 10 μ.

Lorenziana Grun. in Cl. & Grun., *v. subtilis* Grun. in Cl. & Grun., W & T at Rokupr (site 4, May 1953 at pH 6.2), measuring 63 μ long, 4.0 μ wide, carinal puncta 8 in 10 μ, striation strong 14 in 10 μ. The type has been found by SS in Senegal and « French » Guinea.

navicularis (Bréb. ex Ktz.) Grun. in Cl. & Grun., LF : W & T.

nicobarica (Grun.) Grun. in Cl. & Grun. *v. alata* (Lend.-Fort.) Amossé., LF as *N. superba* Leud.-Fort.

obsidialis Hust., W & T, at Rokupr (2280, site 1, March 1953 at pH 6.0) a little smaller than published for Edward Nyanza, 50 μ long, 5 μ wide, the carinal puncta 9 in 10 μ.

obtusa W. Sm., W & T at Kaikonki.

.. *v. brevissima* Grun. in V. H., W & T at Rokupr and Mambolo; It has been recorded for several Guinea Coast countries. It includes *N. parvula* Lewis as shown in Pascher, not *N. parvula* W. Sm.

.. *v. maxima* Grun. in Cl. & Grun., W & T at Rokupr (2364, site 10, Feb. 1954 at pH 6.0) slightly broader than even Grunow's diagnosis, 243 μ long, 14 μ wide, carinal puncta 6 in 10 μ.

.. *v. scapelliformis* Grun. in Cl. & Grun., W & T, quite common at Rokupr, also found at Mambolo and Kaikonki.

palea (Ktz.) W. Sm., W & T in most of the Rokupr samples, where frequent at times. Also occurs at Mambolo.

panduriformis Greg., LF : W & T at Rokupr, Kaikonki and Kipimp.

.. *v. minor* Grun. in Cl. & Grun., W & T.

pseudosigma Hust., W & T at Rokupr (2288, site 6, May 1953 pH 6.1) measuring 58 μ long, 4,7 μ wide. The first African record, for the plant described for Java.

punctata (W. Sm.) Grun. in Cl. & Grun., W & T.

Ralfsii nom. nov. nobis, see *N. constricta* above.

recta Hantzsch in Rabb., W & T.

reversa W. Sm., W & T at Rokupr (2290, site 8, June 1953 at pH 3.3 to 3.6). Smaller than the figures published, 49-56 μ long, 4.2-4.7 μ wide, the carinal puncta 12 in 10 μ.

scalaris (Ehr. ex p.) W. Sm., W & T.

Source MNHN Paris

sierra-leonensis nom. nov. nobis, LF as *N. africana* sibi (p. 15, pl. III, f. 5), an invalid name in view of *N. africana* Cl. & Möller 1856.

sigma (Ktz.) W. Sm., LF : W & T.

.. *v. sigmatella* Grun. in V. H., W & T, at times abundant.

spectabilis (Ehr.) Ralfs in PRITCHARD, W & T.

stagnorum Rabh., W & T, abundant in polder 7.

sublinearis Hust. in A. S., W & T. CHOLNOKY recently found this in Transvaal.

subtilis (Ktz.) Grun. in CL. & GRUN., W & T; it has been recorded for French Soudan.

tropica Hust., W & T (Rokupr, 2366, site 1); there are as yet, few African records.

Tryblionella Hantzsch in RABH., LF : W & T at Rokupr, Mambolo and Kaikonki.

.. *v. crassa* (Pant.) A. Cl.-Eul., W & T at Rokpur (2358, site 6, Dec. 1953 at pH 4.3), smaller than sizes published, 17 μ long, 8.5 μ wide, and not as apiculate as *v. debilis*. Ribs 8 in 10 μ.

.. *v. debilis* (Arn.) A. Mayer auct., W & T at Kaikonki (2336, Dec. 1953), measuring 16.5 μ long, 8 μ wide.

.. *v. levidensis* (W. Sm.) Grun. in CL. & GRUN., W & T. at Rokupr and Kipimp.

.. *v. victoriae* (Grun.) Grun. in CL. & GRUN., W & T at Rokupr and Mambolo.

This species and its varieties are fairly common at Rokupr.

kaikonkiensis sp. nova nobis, first seen entire in a collection from the edge of a rice-bearing swamp at Kaikonki (2336, Dec. 1953). Also a long fragment at Rokupr (polder 9, Dec. 1953).

Lineares, the frustule linear, with straight parallel sides, suddenly tapered acutely at the poles into a short but well-defined apiculus, 87 μ long, 5 μ wide. Raphe filiform, the carinal puncta 12-13 in 10 μ, uninterrupted, striae delicate, about 40 in 10 μ, at least 3 in relation to each punctum. This diatom has no close affinities in the genus. Fig. 12, 16.

Frustula lineari marginibus rectis parallelisque, ad apices in apiculo curto sed distincte attenuata, 87 μ long., 5 μ lat. Raphe filiformis, punctis carinalibus 12-13 in 10 μ in medio non interruptis; striis delicatissimus, circa 40 in 10 μ.

OEDOGONIUM

Sterile filaments occur at Rokupr.

Source MNHN Paris

OPEPHORA

marina (Grun. in V. H.) Hust. in RABH., LF.

Martyi Hérib., W & T at Rokupr (2293, July 1953) measuring 22 μ long, 7 μ wide, with 6 striae in 10 μ. We have not seen other records for Africa.

pacifica (Grun.) Petit, LF.

Schwartzii (Grun. in V. H.) Petit in PELL., LF.

OSCILLATORIA

Cortiana (Poll.) Gom., W & T, abundant in polder E at Rokupr. The only other African record is for Tanganyika.

limosa [(Roth) Ag.] Gom., W & T, abundant in the same polder.

PARALIA

sulcata (Ehr.) Cl., LF : W & T, one of the more prominent diatoms, nearly always present in great quantity at Rokupr and also occuring at Kaikonki and Kipimp. SS records for the Guinea Coast countries.

PINNULARIA

biceps Greg., W & T, not uncommon at Rokupr and Mambolo.

borealis Ehr., LF. We have seen it elsewhere in Sierra Leone.

Brebissonii (Ktz.) Rahh., W & T.

gibba Ehr. W & T.

The nomenclature of this well-known diatom is wrapped in confusion; BOYER and others have pointed out the labyrinth into which any searcher for the history of this plant will wander. For those of us who desire to refer geographically or ecologically to a common plant the confusion is lamentable, even discreditable to the reputation of taxonomy. Diatomists generally agree what is meant by *Pinnularia gibba*, but as several diatoms seem to have been illustrated on the earlier plates, and described in standard texts (EHRENBERG, KÜTZING, W. SMITH, etc.) it is well-nigh impossible to pin down who actually described first the *Pinnularia gibba* of our modern scholarship. BOYER chose to accept the illustrations in VAN HEURCK's Synopsis, where they appeared under the guise of *Navicula gibba* (Ktz.) V. H.; he said these exactly corresponded with the American specimens he examined. The transfer to *Pinnularia* (under these conditions) was BOYER's own, but we feel that he would have saved many perplexities if he had created an entirely new name. Alternatively he could have resuscitated *Pinnularia slauroplera* which cannot be separated

Source MNHN Paris

from the idea of *P. gibba* (Grun.) Rabh., 1864, though it is admitted this would have started off another line of confusion. A. CLEVE-EULER, indeed, has used *P. stauroptera* for the general concept of *P. gibba*, but unfortunately also retained *Pinnularia gibba* for a different diatom pictured hy Wm. SMITH! This has slender valves with narrow axial areas and is shown on his plate XIX, fig. 180, with which A. CLEVE-EULER's figures 1092, *a* and *b* are equated. We have recommended this plant of SMITH should be called *P. Smithii* W & T, which will clear away its share in the confusion.

Undoubtedly « *Pinnularia gibba* » will continue to be a source of error and confusion and therefore under Articles 63 and 65 it should be entirely rejected and a new epithet chosen. We suggest it should be based on BOYER's Diatoms of Philadelphia (plate 30, fig. 5) and A. CLEVE-EULER fig. 1091 a. We also suggest that *Pinnularia Van Heurckii* should be used in this sense.

leptosoma (Grun. in V. H.) Cl., W & T.
major (Ktz.) W. Sm., W & T at Rokupr and Mambolo.
mesotepta (Ehr.) W & T.
.. *f. angusta* (Cl.) Hust. in PASCHER, W & T.
microstauron (Ehr.) Cl., W & T at Rokupr and Mambolo.
nobilis Ehr., LF. We have found it elsewhere in Sierra Leone.
parva (Ehr.) Greg., W & T.
subcapitata Greg., W & T.
.. *v. Hilseana* (Jan. in HILSE) A. Cl.-Eul., W & T.
sudetica Hilse, W & T.
viridis (Nitzsch) W. Sm., W & T at Rokupr and Mambolo.

PLAGIOGRAMMA

atomum Grev., LF.
polymorphum Cl., LF.
pygmaeum Grev., W & T, measuring 24 μ long.
rokupriense **sp. nova nobis**, at Rokupr (2291, polder 9, June 1953 at pH 6.5-7.0). The large capitate ends are without ornament, and there is also a wide transverse band devoid of ornament across the central inflation. Two abstrictions on each side this middle portion, one close to it and the other near the end. There is a gradual tapering of the sides from the middle to this apical constriction. Length 28 μ, breadth 4 μ. Rows of beads 8 in 10 μ, the beads prominent. Fig. 14.

Apicibus magnis capitatisque sine decoribus; marginibus valvae ad constrictionem leniter attenuatis, etiam medio utrobique constrictis. Medio

Source MNHN Paris

valvae fascia nuda et transversa et lata. 28 μ long., 4 μ lat. Seriebus margaritarum validarum 8 in 10 μ.

staurophorum (Greg.) Heib., LF as *P. Gregorianum* Grev.

PLEURODESMIUM

africanum Leud.-Fort., LF, the type locality.

PLEUROSIGMA

angulatum (Queck.) W. Sm., W & T at Kaikonki and Kipimp; we have not seen any other records for Africa.

australe Grun., W & T at Rokupr (2290, site 8, June 1953 at pH 3.5), of small size, 77.5 μ long, 11 μ wide, the central striation delicate, about 22 in 10 μ. We have no further records for Africa.

delicatulum W. Sm., LF.

formosum W. Sm., LF; W & T.

nubecula W. Sm., LF.

rigidum W. Sm., LF.

strigosum W. Sm. *v. latum* (Cl. in Cl. & Grun.) A. Cl.-Eul., LF.

Stuxbergii Cl. & Grun., *v. rhomboides* (Cl. in Cl. & Grun.) Cl., LF as *P. rhomboides*.

RHABDONEMA

adriaticum Ktz., LF.

arcuatum (Lyngb.) Ktz., LF. There is no doubt that the epithet was first used by Lyngbye, not Agardh.

minutum Ktz., LF.

RHAPHONEIS

amphiceros (Ehr.) Ehr., LF : W & T.

RHOICOSPHENIA

marina (Ktz.) M. Schmidt in A. S. 1899, LF. This is the correct citation, originating from *Gomphonema curvatum* γ *marinum* Ktz., 1844 which W. Smith elevated to *Gomphonema marinum* (Ktz.) W. Sm. 1853, never claiming its authorship for himself.

RHOPALODIA

gibba (Ehr.) O. Müll., *v. ventricosa* (Ktz.) V. H., W & T at Kaikonki.

gibberula (Ehr.) O. Müll., W & T, occasional.

.. *v. producta* (Grun.) O. Müll., W & T.

.. *v. rupestris* (W. Sm.) O. Müll., W & T at Kipimp.

Source MNHN Paris

musculus (Ktz.) O. Müll., W & T in most of the Rokupr samples, also found at Mambolo. CHOLNOKY does not think it to be halophilous.

SCEPTRONEIS

australis (Petit) Grun. in V. H. LF.

australis (Petit) Grun. in V. H. *v. rokuprensis* **var. nov. nobis,** Rokupr (2292, July 1953), both poles rounded, the top one somewhat subcapitate, the sides tumid. 22 μ long, 5.5 μ wide, the striae 8-9 in 10 μ, punctate. Fig. 29.

Marginibus tumidis, apicibus utrisque rotundatis, apice superiori fere subcapitati, 22 μ long., 5.5 μ lat. Striis transapicalibus punctatis 8-9 in 10 μ.

caduceus Ehr., W & T at Kaikonki.

SCHUETTIA

annulata (Wall.) De Toni, W & T at Rokupr and Kipimp, at the former (2340, site 8, Dec. 1953 at pH 4.3) a form with the sides less concave, each side 42 μ long. Fig. 28. We have not seen other African localities for this beautiful rare diatom.

SCOLIOPLEURA

tumida (Bréb. ex Ktz.) Rabh., LF.

SIROGONIUM

Filaments occur at Rokupr; they are all sterile.

SPIROGYRA

Sterile filaments are abundant in several Rokupr polders (1, E, and F.).

SPIRODISCUS

flexuosa (Ehr.) **comb. nov. nobis,** W & T. JURILJ has indicated the desirability of placing *Surirella spiralis* in this genus, and his transfer was published as *Spirodiscus spiralis* (Ktz.) Jurilj, 1949. PANTOCSEK and others have deemed *Surirella spiralis* Ktz., 1844 to be synonymous whit *Surirella flexuosa* Ehr., 1843, which as the earlier epithet should have priority. JURILJ himself had stated that *S. flexuosa* and *S. spiralis* are synonyms. There are no other African records for this distinctive diatom.

STAURONEIS

unceps Ehr., W & T at Rokupr and Mambolo.

.. *v. gracilis* (Ehr.) Brun, W & T.

Source MNHN Paris

Both of these have been seen for « French » Guinea.

crucicula (Grun. in Cl.) Boyer, W & T at Rokupr and Kaikonki. When BOYER placed GRUNOW's *Schizostauron crucicula* in the genus *Stauroneis* he was aware that there was already *Stauroneis crucicula* W. Sm., 1853, which had become *Navicula crucicula* (W. Sm.) Donkin. Hence two different plants compete for the same name, but BOYER preferred to retain GRUNOW's epithet in « apparent violation of the rule of priority ». This was indeed a dangerous expedient, confusing the identities of the two plants, a matter that has been detected in some lists of algae. It is better to give *Schizostauron crucicula* Grun. in CLEVE 1881 a new epithet in the genus *Stauroneis*, and we propose *Stauroneis merrimacensis* **comb. nov. nobis**, derived from the type locality of the diatom (L. Merrimac, vide BOYER, 1926-27, p. 426). In BOYER's Diatoms of Philadelphia it was named in error *S. crucicula* (Grun.) Cl.

groenlandica Ostr., 1895, W & T at Rokupr (2290, polder 8, June 1953 at pH 3-3.5) slightly narrower and shorter than the *v. genuina* given by A. CLEVE-EULER, 23 μ long, 4.6 μ wide; striation very delicate, more than 30 in 10 μ, leaving a distinct fascia across the middle. The first African record.

merrimacensis W & T (supra) *v. intermedia* **var. nov. nobis**, (Rokupr, 2271, 2280 and 2345, sites 1, 10 and 12, March and Dec. 1953, the pH range 6.0 to 7.0). In addition to the material falling under *v. merrimacensis* occur diatoms with intermediate characters between *f. gracilior* and *v. obtusa* as placed under *S. crucicula*, viz., Ends evenly rounded not rostrate, 20-28 μ long, 5.5-8.0 μ wide. The striae bounding the transverse central area distinct and arranged in a « saltire », thick and shining. The same diatom occurs at Mamholo (2352). Fig. 27.

Valvis 20-28 μ long., 5.5-8.0 μ lat., apicibus aequaliter rotundatis non rostratis. Striis crassis et refringentibus ad nodulum centralem in forma crucis Sancti Andrei ordinant.

The synonymy thus required for *S. merrimacensis* is :

v. merrimacensis **nom. nov.** for GRUNWO's plants.

f. obtusa (O. Müll.) **comb. nov. nobis** for *Stauroneis crucicula f. obtusa* O. Müll., 1910.

f. gracilior (O. Müll.) **comb. nov. nobis** for *Stauroneis crucicula f. gracilior* O. Müll., 1910.

v. intermedia W & T supra.

parvula Grun. in CL. & MÖLL., W & T.

STENOPTEROBIA

intermedia (Lewis) V. H., W & T.

Source MNHN Paris

STEPHANODISCUS

astraea (Ehr.) Grun. in Cl. & Grun., W & T.

.. *v. minutula* (Ktz.) Grun. in V. H., W & T at Kipimp. These diatoms are known throughout A.O.F.

dubius (Fricke in A. S.) Hust. in Rabh., W & T. There does not seem to be a previous African record.

.. *v. radiosus* A. Cl.-Eul., W & T at Rokupr (2293, July 1953) the diameter 14-15 μ. Not known for Africa.

STEPHANOPYXIS

superba (Grev.) Grun., W & T at Rokupr and Kipimp. There are no other African records.

STRIATELLA

interrupta (Ehr.) Grun., LF.

unipunctata (Lyngb.) Ag., LF : W & T : SS records it for Dakar.

SURIRELLA

asperrima Hust. in Hub.-Pest. *v. asperrima* nom. nov. at Rokupr.

.. *f. rokuprensis* forma nova nobis at Rokupr (2361, site 5, Dec. 1953, and 2366, site 1, Jan. 1954, the pH 6.8 to 7.0). Smoothly oval with rounded poles, 21-33 μ long, 14-18 μ wide. Short firm thorns on the wave crests about one-third of the way from the edge of the central area to the windows. Ribs 20 in 100 μ, short striae on the outer part of the central area. Fig. 4.

Few, if any other, species of *Surirella* have thorns on the central field. There are no African records for *S. asperrima*, which was originally described for southern Siberia.

bifrons (Ehr.) Ehr., W & T, at times at Rokupr.

.. *v. tumida* O. Müll. *f. minor* O. Müll., W & T at Rokupr (2342, polder E, Dec.) measuring 35 μ long, 14 μ wide, with 35 ribs in 100 μ. This is *S. biseriata v. diminuta* A. Cl.-Eul.

elegans Ehr., W & T.

Engleri O. Müll., W & T, somewhat common at Rokupr.

.. *v. constricta* O. Müll., W & T at Mambolo.

.. *v. constricta f. minor* f. nova nobis at Rokupr (2342, polder E, Dec. 1953), has the proportions of length to breadth 7 : 1, i.e. 100 μ long, 14 μ wide, thus about half the size of the variety.

Paene duplo minoribus quam varietatem Engleri, *100 μ long, 14 μ lat., ratione 7/1.*

Source MNHN Paris

fastuosa Ehr., LF.
gemma (Ehr.) Ktz. W & T at times frequent. SS gives it for Senegal.
helvetica Brun. W & T.
linearis W. Sm. W & T at Rokupr, Mambolo and Kaikonki.
.. *v. constricta* (Ehr.) Grun., W & T.

Few people have given synonyms for this widespread diatom. MILLS stated that *S. linearis* W. Sm., 1853 and *S. tenella* Ktz., 1849 are synonymous, a view which is also stated by ZANON (1938); v. SCHÖNFELDT in PASCHER had made the second as a variety of the first, an indication of the relationship. All this points to a strong suggestion that under Article 57 of the International Code *S. tenella* should be used as being the earlier epithet. In that case *S. linearis* becomes a synonym; *S. linearis v. constricta* will become *S. tenella v. constricta* (Ehr.) comb. nov.

ovalis Bréb., W & T.
ovala Ktz., W & T.
.. *v. pinnata* (W. Sm.) Hust. in PASCHER, W & T at Rokupr and at Kaikonki; CHOLNOKY recorded it recently for Africa (Transvaal).
.. *v. pinnata f. panduriformis* (W. Sm.) A. Cl.-Eul., W & T at Rokupr and Kaikonki. There are no previous African records.
.. *v. salina* (W. Sm.) Rabh., W & T, at times abundant.
recedens A. S., W & T; there are no previous African records.
robusta Ehr., W & T, abundant in some of the Rokupr polders; it has been recorded recently by SS for Senegal.
.. *v. splendida* (Ehr.) V. H., W & T at Rokupr (frequent at times), Kaikonki and Kipimp.
rokuprensis sp. nova nobis, Rokupr (2342 and 2345, polders E and 10, Dec. 1953, at pH 6.0). Isopolar, elongate cylindrical with the sides slightly convex, the poles widely rounded, 22.5-28 μ long, 7-9 μ wide. Costae delicate, ocellate at their free edges, 8-10 in 10 μ, and reaching almost to the middle line where only a faint and linear pseudoraphe is left. Striae very delicate. Fig. 5.

Apicibus aequalibus, frustulis elongatis cylindraceis lateribus leniter convexis, polis late rotundatis, 22.5-28 μ long., 7-9 μ lat. Costis delicatis ocellatis ad exteriorem, fere ad mediam attingent, 8-10 in 10 μ. Pseudoraphe lineari et tenui. striis delicatissimis.

rudis Hust. in A. S. We have seen several plants which seem to fall here. At Rokupr (2280, site 1, March 1953), a little smaller

Source MNHN Paris

than HUSTEDT's measurements, viz. 54 μ long, 22 μ wide, otherwise as in his description. This occurred at pH 6.0. Fig. 8.

rudis v. sierra-leonensis var. nova nobis, at Mambolo (2352) 46.2-53 μ long, 19 μ wide near the upper pole; costae 30 in 100 μ, narrower than the valleys in between, the ribs (canals) widening outwards. Fig. 9.

Frustulis 46.2-53 μ long., 19 μ lat., prope apicem superiorem; costis 30 in 100 μ, angustioribus quam valles, ad exteriores latioribus.

rudis v. sierra-leonensis f. constricta f. nova nobis, at Rokupr (2344 and 2358, sites 2 and 6, Dec. 1953, both at pH 7.0), 45-59 μ long, 23-24 μ wide, near the upper pole, with a constriction along the sides, only 21 μ wide Costae (wing canals), 25-30 in 100 μ these widening outwards and becoming finely punctate. Fig. 7.

Frustulis 45-59 μ long., 23-24 μ lat., prope apicem superiorem, marginibus leniter concavis solum 21 μ lat. Costis ad exteriores latioribus, delicate punctatis, 25-30 in 100 μ.

All these variants of *S. rudis* are much smaller than previously recorded.

tenera Greg. W & T.

SYNEDRA

acus Ktz., W & T.
parasitica (W. Sm.) Hust. in PASCHER, LF.
tabulata (Ag.) Ktz., W & T.
ulna (Nitzsch) Ehr., W & T.

TABELLARIA

fenestrata (Lyngb.) Ktz., W & T.
floccosa (Roth) Ktz., W & T at Rokupr and Mamholo.

TERPSINOE

americana (Bail.) Ralfs in PRITCHARD, LF: W & T. SS has now recorded it for the Ivory Coast.
musica Ebr., LF. This, too, is recorded by SS for Ivory Coast.
.. *v. intermedia* (Grun.) Hust. in RABH., LF. The type locality of GRUNOW's plant was Sierra Leone. Also among SS's plants for Ivory Coast.

THALASSIOTHRIX

africana sp. nova nobis, Rokupr (site 8, June 1953 at pH 3.0 to 3.5). This shows slight heteropolarity, one end being slightly capitate with a single apiculus visible, the other end truncate

Source MNHN Paris

with two visible apiculi, 172.5 μ, 4.6 μ wide. Striae 14 in 10 μ. Fig. 1. There is a possible comparison with *T. Frauenfeldii.*

Apicibus leniter inaequalibus, polo uno subcapitato cum apiculo, polo alteri truncato cum duo apiculis, 172.5 μ long., 4.6 μ lat., striis 14 in 10 μ.

Frauenfeldii (Grun.) Grun. in CL. & GRUN., W & T : SS has recorded it for Senegal and Portuguese Guinea.

nitzschioides Grun. in V. H. LF : SS has recorded it for Senegal and Portuguese Guinea.

TRACHYNEIS

aspera (Ehr.) Cl., LF : SS records it for Senegal and Portuguese Guinea. We have found it elsewhere in Sierra Leone.

.. *v. parallela* var. nova nobis, at Kaikonki (2336), a small variety, 53 μ long, 11 μ wide, broadly linear, the middle part with parallel sides, the ends rounded cuneate. Striae 9-11 in 10 μ.

TRICERATIUM

affine Grun. in V. H. LF.

alternans Bail., LF. SS has records for Senegal and Portuguese Guinea.

antediluvianum (Ehr.) Grun., LF.

contortum Shadb., LF. SS recorded it for Portuguese Guinea.

cruciferum A. S., LF.

cuspidatum Jan. in A. S., LF.

dubium Brightw., LF (including *T. bicorne* Cl.) SS has recorded it for Senegal.

favus Ehr., LF : W & T often present at Rokupr, also found at Kaikonki and Kipimp.

.. *f. parvum* f. nova nobis at Rokupr (2289, site 4, May 1953 at pH 6.5) with the sides only 43.5 μ long, i.e. about half the standard size.

Paene duplo minoribus, marginibus 43.5 μ longis.

.. *f. quadratum* Grun. in A. S., LF. SS recorded it for Senegal.

inconspicuum Grev., LF.

quinquefolium Leud.-Fort., LF, the type locality.

reticulum Ehr., LF (as *T. sculptum* Shadb.); SS records it for Ivory Coast.

.. *f. trigona-minutum* (V. H.) A. Cl.-Eul., W & T at Rokupr (site 9, Dec. 1953 at pH 7.0) of triangular shape, only 24 μ long, smaller than previous dimensions.

Source MNHN Paris

scitulum Brightw., LF : SS records for Portuguese Guinea.
.. *v. quadratum* Brightw., LF.

TROPIDONEIS

lepidoptera (Greg.) Cl., *v. proboscidea* (Cl.) Cl., W & T abundant in several Rokupr sites.

VAUCHERIA

Sterile filaments have been found at Rokupr.

ZYGNEMA

Sterile filaments occur abundantly at Rokupr.

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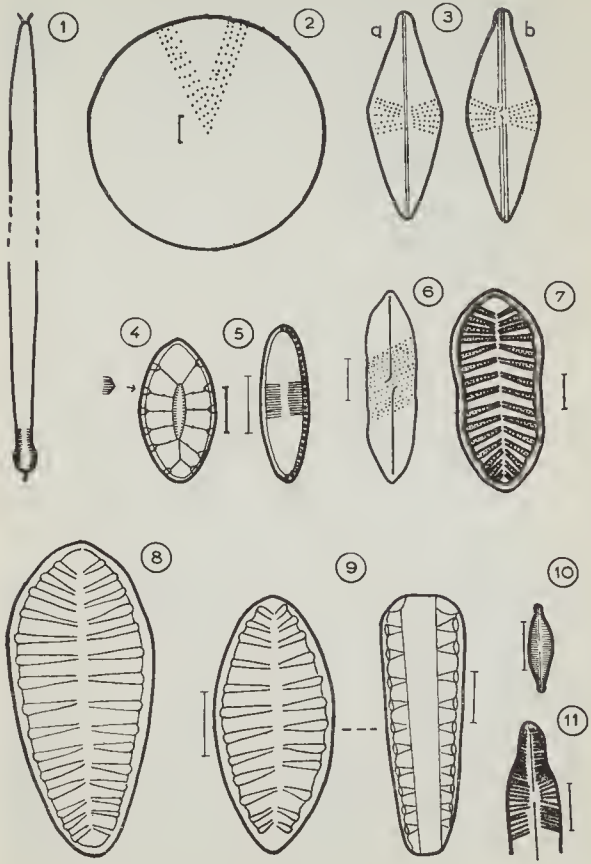
Source MNHN Paris

FIGURES OF PLATES

1. *Thalassiothrix africana* sp. n.
2. *Cosciuodiscus radiatus* forma.
3. *Achnanthes Jacksonii* sp. n., and (a) rapheless, (b) raphe valve.
4. *Surirella aspertima* forma *rokuprensis* f. nov.
5. *Surirella rokuprensis* sp. n.
6. *Neidium Kozlowii* v. *sierra-leonensis* var. n.
7. *Surirella rudis* v. *sierra-leonensis* f. *constricta* f. nov.
8. *Surirella rudis.*
9. *Surirella rudis* v. *sierra-leonensis* v. nov. valve and girdle.
10. *Navicula kaikoniensis* sp. n.
11. *Navicula* sp. fragment.
12. *Nitzschia kaikoniensis* sp. n.
13. *Hemiaulus longispinosus* sp. n.
14. *Plagiogramma rokupriense* sp. n.
15. *Navicula kolentiensis* sp. n.
16. *Nitzschia kaikoniensis* sp. n.
17. *Campylosira cymbelliformis* v. *producta* var. n.
18. *Amphora bigibba* Grun. in A. S.
19. *Nitzschia antillarum.*
20. *Gomphonema olivaceum* v. *balticum* f. *dubium* A. Mayer.
21. *Cymbella punctata* sp. n.
22. *Achnanthes pusilla* sp. n. raphe and raphcless valves.
23. *Fragilaria leptostauron* v. *stauroneiformis* var. n.
24. *Eunotia margaritata* sp. n. and detail of dorsal margin.
25. *Euglena mulabilis* forma.
26. *Trachyneis aspera* v. *parallela* var. n.
27. *Stauroneis merrimacensis* v. *intermedia* var. nov.
28. *Schuettia annulata.*
29. *Sceptroneis australis* var. *rokupriensis* var. nov.

Source MNHN Paris

FRESH WATER ALGAE OF SIERRA LEONE. Pl. I.



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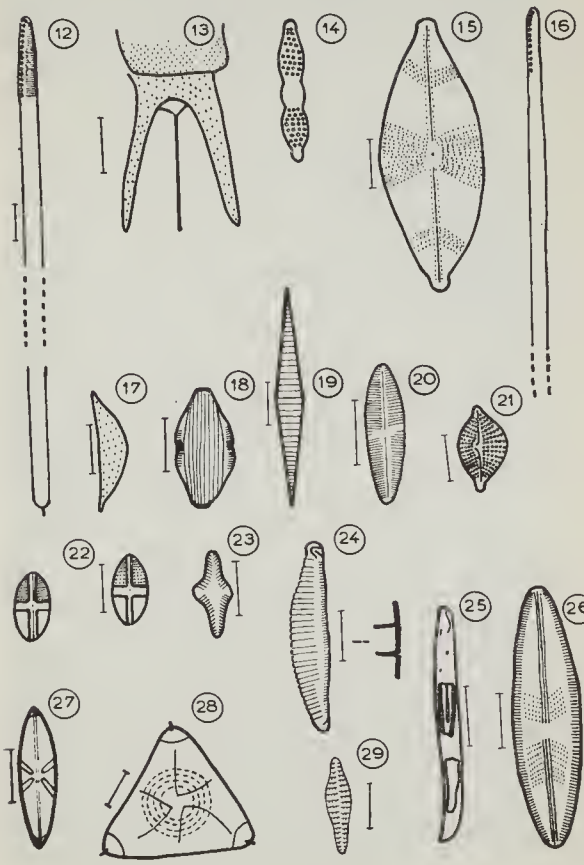
FRESH WATER ALGAE OF SIERRA LEONE. Pl. II.



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NOTULES ALGOLOGIQUES

Cette rubrique réunit de courtes notes sans illustrations ni références bibliographiques. Elle permettra aux auteurs de publier des observations nouvelles ne se prêtant pas à un long développement, notamment celles concernant l'écologie ou la biogéographie des Algues, ou de prendre date avant la parution d'un travail plus complet.

■

Sur une algue marine trouvée dans un gisement précolombien au Pérou.

Il y a quelques mois, M. J. Leroy, sous-directeur du Laboratoire d'Agronomie tropicale du Muséum, m'a transmis trois échantillons végétaux recueillis en 1950, au Pérou, par M. et Mme H. Reichlen au cours de l'étude d'un gisement de débris précolombiens (basurales) dans la baie de Paracas à environ 300 km. au Sud de Lima. Ces échantillons datent de la dernière période de la civilisation ica (période Ica-inka). La civilisation ica est celle qui a précédé dans cette région la civilisation inka et le gisement remonte environ au XIVe siècle de l'ère chrétienne.

Un des trois échantillons est constitué de feuilles de Monocotylédone appartenant peut-être à la famille des Marantacées ou des Zingibéracées. Les deux autres échantillons sont des algues marines desséchées et décolorées. Placés dans l'eau, ces échantillons se regonflent assez rapidement pour reprendre l'aspect qu'ils avaient à l'état frais, sauf certaines portions, sans doute déjà altérées lors de leur dessication, qui se résolvent en mucilage.

L'étude anatomique des échantillons regonflés montre que la structure est parfaitement conservée ainsi que les organes reproducteurs (cystocarpes). Il s'agit en effet d'une Rhodophycée de l'ordre des Gigartinales : *Gigartina Chauvinii* (Bory) J. Ag. Cette algue, primitivement décrite par Bory de St Vincent (Histoire des Hydrophytes ou plantes agames des eaux récoltées par MM. d'Urville et Lesson, dans leur voyage autour du monde sur la corvette de Sa Majesté, La Coquille, *Paris*, 1829, p. 165, pl. 20) sous le nom de *Sphaerococcus Chauvinii* Bory, est connue depuis le Cap Horn et la Terre de Feu jusqu'au Nord du Pérou (à Payta, 5° Lat. S. env.). C'est une algue d'eau relativement froide, dont la remontée tout le long de la côte pacifique de l'Amérique du Sud s'explique par l'existence du courant de Humboldt.

Pour quelle raison les anciens Indiens récoltaient-ils cette algue? Il semble bien que ce soit pour des usages alimentaires. En effet, M. A. Howe, dans son étude des algues récoltées au Pérou par

Source : MNHN, Paris

R. E. Coker (Marine Algae of Peru. *Mem. Torrey Botanical Club*, vol. XV, 1914) signale que le *Gigartina Chauvinii* est vendu sur les marchés de Lima sous le nom de « uyos » et est consommé sous forme de salade, de soupe ou de friture, ajoutant d'ailleurs « not generally esteemed on the best tables ». Plus récemment, H. Etchevery (Algas marinas chilenas productoras de Ficocoloides, *Rivista di Biol. mar.*, vol. VIII, p. 153-174, Valparaiso, 1958) donne des indications analogues.

Mme Reichlen a bien voulu me confirmer que des algues marines sont toujours utilisées actuellement au Pérou (sous le nom de « Kocha Yu-Yo »). Seuls les indigènes les consomment jusque dans la Cordillière Nord où elles sont transportées fraîches.

Il n'est pas possible de penser que la coutume actuelle ait été introduite par les conquérants espagnols, puisqu'en Espagne, les Algues ne sont pas utilisées pour l'alimentation. La présence de cette algue dans le gisement découvert par M. et Mme Reichlen semble montrer, au contraire, que son emploi actuel est la persistance d'une coutume précolombienne.

La consommation d'une algue marine par les anciens péruviens a peut-être pour les Ethnographes un autre intérêt. L'emploi des algues marines dans l'alimentation humaine est surtout développée le long des côtes asiatiques du Pacifique (Japon, Chine, Insulinde) ainsi qu'en Océanie (Hawaï) alors qu'elle semble inconnue ou exceptionnelle dans beaucoup d'autres régions du globe. Or on admet généralement, à la suite des travaux de P. Rivet que le peuplement humain de l'Amérique du Sud ne s'est pas effectué seulement par voie terrestre à travers le détroit de Behring et l'Amérique du Nord mais aussi par voie maritime directe ayant conduit en Amérique des peuples originaires du Sud-Est asiatique. On a retrouvé en effet, dans l'ancienne civilisation du Pérou, beaucoup d'éléments culturels d'origine malayo-mélanésienne (propulseur, fronde, flute de Pan, danses masquées, têtes-trophées) qui semblent confirmer cette manière de voir (P. Rivet, Les Océaniens, *Mém. Soc. Biogéogr.* IV, 1934).

L'emploi, par les Indiens précolombiens, d'algues marines pour leur alimentation, peut donc, peut-être, être considéré comme un nouvel argument en faveur de la thèse soutenue par Rivet.

Jean Feldmann.

Source MNHN Paris

BIBLIOGRAPHIE

Les conditions actuelles de l'imprimerie ne permettant plus d'envisager la parution d'une Bibliographie Algologique méthodique comme dans la première série de cette revue, il ne sera publié que des indications bibliographiques concernant les ouvrages importants ou les mémoires d'intérêt général. Les lecteurs de langue française peuvent trouver un complément d'information dans la « Bibliographie » paraissant en annexe au « Bulletin de la Société botanique de France » et dans le « Bulletin analytique » publié par le Centre National de la Recherche Scientifique.

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BEKLEMISKEV C. W. — Sur la colonialité des Diatomées planctoniques. — *Intern. Rev. Gesem. Hydrobiol.* **44**, **1**, p. 11-26, 2 pl. 1959.

L'Internationale Revue der Gesamten Hydrobiologie reprend sa publication. Nous y relevons cet intéressant travail sur la formation coloniale chez les Diatomées planctoniques.

L'auteur montre que les formes coloniales sont de régle chez les Diatomées planctoniques et il étudie les avantages et les inconvénients de ces groupements.

La colonie favorise les cellules de 10 à 100 μ en les protégeant contre les petits prédateurs animaux. Par contre la formation des colonies rend souvent la flottaison difficile et réduit le métabolisme cellulaire. Les cellules de moins de 10 μ sont favorisées par la vie solitaire, elles échappent aux gros crustacés, et leur taux rapide de multiplication leur permet la survie malgré les ravages des petits animaux.

L'auteur montre enfin les diverses étapes des formations coloniales : les formes les plus évoluées, comme *Thalassiosira* ont des colonies solides mais disjointes. Les Pennales qui semblent benthiques à l'origine, ont une grande diversité de formes de colonies, mais les modes de connection des cellules entre elles restent primitifs.

Nous avons là une étude fort intéressante et ne nombreuses hypothèses étayées par des observations très précises.

P. By.

BIEBL R. — Zellphysiologische Beobachtungen an Blasenzellen einiger Rotalgen. — *Botanica Marina*, vol. I, fasc. 1-2, 2-14, 6 fig. phot.; Hambourg 1959.

L'auteur, soumettant à diverses expériences des thalles de *Asparagopsis armata*, *Falkenbergia rufolanosa*, *Bonnemaisonnia hamifera*, *Trailliella intricata*, *Antithamnion plumula*, et *Antithamnion sarniense*, a étudié la résistance de leur cellules secrétrices. La résistance osmotique des cellules secrétrices des Bonnemaisoniacées est plus grande que celle des Céramiacées en solution hypotonique, par contre, en solution hypertonique les deux espèces d'*Antithamnion* résistent à une concentration double de celle de l'eau de mer tandis que les Bonnemaisoniacées ne supportent pas plus de 1,2 de concentration. Les limites de résistance osmotique ne sont pas les mêmes pour les cellules secrétrices et pour les autres cellules du thalle. Une immersion de 1/2 à 1 minute dans l'eau distillée fait éclater presque toutes les cellules

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secrétrices de l'*Antithamnion plumula,* replacé dans l'eau de mer normale les autres cellules du thalle restent en vie. Soumises au froid (— 30°), les cinq espèces meurent et leurs cellules secrétrices se vident; par contre, en cas de mort par la chaleur (+ 30°), les cellules glandulaires de ces différentes espèces ne réagissent pas de la même façon : chez *Asparagopsis, Falkenbergia,* et *Bonnemaisonia,* les cellules secrétrices sont détruites au moment où elles meurent, tandis que chez les espèces d'*Antithamnion* elles restent « fixées » dans leur aspect presque inchangé. Les cellules secrétrices de *l'Antithamnion plumula* et de *Trailliella intricata,* résistent beaucoup mieux au dessèchement que celles des autres cellules du thalle.

Ces intéressantes expériences, sont accompagnées d'excellentes microphotographies.

Fr. A.

Bornet Ed. et Flahaut Ch. — Révision des Nostocacés hétérocystés. — *Repr. Later Starting point Book for botanical nomenclature, vol.* 1, publ. Engelmann, 1959.

L'éditeur J. Cramer (H. R. Engelmann) a entrepris la publication par réimpression photographique des travaux de cryptogamie fondamentaux, servant de point de départ pour la systématique de divers groupes. Cet ouvrage classique, depuis longtemps introuvable, a donc été réimprimé et forme un volume relié toile, très agréablement présenté, il est précédé d'une courte notice biographique et bibliographique sur Bornet et Flahaut. Comme le savent tous les algologues, il s'agit là d'un ouvrage de base, qui n'a pas vieilli et auquel il est indispensable de se reporter pour les diagnoses originales et les listes des spécimens d'herbiers.

P. By.

Fan K. C. — Studies on the life histories of marine algae I. *Codiolum petrocelidis* and *Spongomorpha coalita.* — *Bull. Torrey, Bot. Club.,* 86, 1, p. 1-12, 41 fig. 1959.

Par culture au Laboratoire, l'auteur montre que les *Codiolum petrocelidis* donnent des zoospores qui en germant produisent des filaments typiques de *Spongomorpha coalita.* Ce dernier, qui est dioïque, forme des gamètes à 2 fouets qui par isogamie fusionnent en un zygote. La germination du zygote conduit directement à un *Codiolum.*

Spongomorpha coalita et *Codiolum petrocelidis* représentent donc les phases gamétophyte et sporophyte de la même espèce qui doit porter le nom de *Spongomorpha coalita.*

Cet intéressant travail est à comparer à ceux de Johnsson et Kornmann analysés dans la Revue Algologique, t. IV, f. 4, pp. 284-286.

P. By.

Fan K. C. et Papenfuss G. F. — Red algal parasites occurring on members of the Gelidiales. — *Madrôno,* 15, 2, p. 33-38, 10 fig.

Les auteurs retrouvent les *Choreocolax suhriae et Choreocolax margaritoides* Martin et Pocock et montrent que les caractères des rameaux

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carpogoniaux permettent de placer ces deux espèces parasites dans le genre *Gelidiocolax*. Ils dérivent ensuite une nov. sp. de *Gelidiocolax* des îles Hawaï, parasitant les *Ptericladia*.

Enfin, ils découvrent en Nouvelle Zélande, un nov. gen. *Pterocladiophila* parasite de *Pterocladia* et caractérisé par les tétrasporanges zonées disposées en conceptacles.

Ce nouveau genre monospécifique est placé dans la nov. famille des Pterocladiophilaceae de l'ordre des Cryptoméniales.

P. By.

HUSTEDT Fr. — Die Kieselalgen. — *Rabenhorsts Kryptogamen-Flora*, Bd. VII, 2 Teil, Lief. 6, pp. 785-845, 1959.

Avec ce fascicule se termine la 2e partie du magistral ouvrage de HUSTEDT sur les Diatomées. Ce volume est consacré au genre *Cistula*, *Anomoeoneis* et *Stauroneis*. Pour chaque genre nous trouvons la synonymie, la diagnose, (avec indication de la structure du chromatophore), des notions d'écologie et une clef de détermination. Pour chaque espèce, synonymie très complète, indication des descriptions chez les auteurs classiques, iconographie, collections de préparations, diagnose, répartition géographique, écologie et illustration originale par dessin ou microphotographie.

Au cours de l'ouvrage, l'auteur décrit quelques espèces nouvelles et propose de nov. comb.

Le volume se termine par la table alphabétique des espèces contenues dans la 2e partie toute entière.

Tous les algologues se réjouiront de la publication de ce volume qui reste le travail fondamental dans ce domaine et nous espérons et souhaitons voir paraître rapidement la troisième partie consacrée à des genres particulièrement difficiles et riches en espèces comme *Navicula*, *Pinnularia*, *Nitzchia*, *Surirella*, etc...

P. By.

KANN E. — Die eulitoral Algenzone im Traunsee (Oberösterreich). — *Arch. f. Hydrobiol.*, 55, 2, p. 129-192, 3pl. 1959.

Après une étude très complète des conditions physiques et chimiques des eaux du Traunsee, l'auteur étudie les différentes zonations d'algues microscopiques croissant sur les rives du lac. Elle distingue ainsi les groupements écologiques suivants :

1°) algues peuplant les parois rocheuses abruptes avec *Gloeocapsa sanguinea*, *Scytonema myochrous*, *Calothrix parietina*, *Nostoc sphaericum* de la surface de l'eau à la côte + 60 cm; plus bas de 0 à 60 cm, nous trouverons une ceinture de *Tolypothrix distorta*, et croûte à *Rivularia haematites*, suivie en profondeur d'une zone à *Schizothrix* et à *Dichothrix*.

2°) les blocs rocheux en eau pure montrent une population plus pauvre avec de nombreux *Phormidium* accompagnés de *Pleurocapsa minor* et *Chamaesiphon polonicus*.

3°) les rochers en zone polluée se caractérisent par *Cladophora glomemerata* et les *Chaetophora*.

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4°) sur les pierres de la partie littorale en pente douce, on retrouve la zonation classique présentant successivement *Calothrix fusca, Rivularia, Schizothrix lacustris.*

5°) les rochers où débouchent des sources froides sont peuplés par *Batrachospermum moniliforme, Gongrosira, Homoeothrix.*

6°) les galets sculptés ont une croûte de *Schizothrix* et de *Cyanostylon.*

7°) les corps flottants, montrent eux aussi une zonation très nette avec dans la partie émergée, *Gloeocapsa, Tolypothrix* et *Scytonema;* au niveau de l'eau : *Cladophora* et *Batrachospermum,* enfin dans la base immergée, *Schizothrix lacustris.*

Cette analyse rapide montrera tout l'intérêt de cette étude qui complète les travaux précédents de l'auteur sur les végétations littorales des lacs de Lunz et de la région de Plön.

P. By.

Kumano S. et Hirose H. — On the swarmers and reproduction organs of a phaeophyceas freshwater algae of Japan *Heribaudiella fluviatilis* (Aresch.) Sved. — *Bull. Phycolog. Soc. Japan*, 7, 2, p. 45-51, 1959.

Les auteurs observent la formation des sporanges uniloculaires et pluriloculaires chez *Heribaudiella fluviatilis.*

Les sporanges pluriloculaires naissent au début de l'été, ils présentent 4 (ou rarement 8) cellules donnant chacune une cellule nageuse nue avec stigma, un plaste et 2 fouets inégaux. Ce sont sans doute des gamètes mais la fusion n'a pas été vue.

Les sporanges uniloculaires donnent 8 zoospores qui sont libérées à l'automne, La zoospore possède 1 ou 2 plastes, un stigma et 2 fouets inégaux. La germination jusqu'au stade de 2 cellules a été observée.

P. By.

Kusnezow S. I. — Die Rolle der Mikroorganismen im Stoffkreislauf der Seen (traduit du russe par A. Pochmann). — 1 vol. 301 pp., 77 fig. Berlin 1959.

Comme l'indique le titre, il ne s'agit pas d'un livre d'algologie, mais d'un résumé de nos connaissances sur l'importance des bactéries dans le cycle des substances dans les eaux de lacs. Ce livre renferme huit chapitres. L'auteur nous rappelle d'abord les grands traits de la limnologie des lacs, hydrologie et chimie, puis il traite rapidement des dépôts lacustres et des méthodes bactériologiques d'analyse des eaux et des vases.

Le 3e chapitre est consacré à la répartition des Bactéries dans l'eau et la vase, et aux facteurs qui régissent cette répartition : lumière, température, zooplancton, bactériophage, phytoplancton.

Le 4e chapitre examine l'influence des microorganismes, les variations de l'oxygène dissous tandis que le 5e chapitre étudie le cycle du carbone dans les lacs et tout spécialement la décomposition des organismes planctoniques et des matières organiques (attaque anaérobie des hydrates de carbones des corps gras, des celluloses et hémicelluloses).

Le 6e chapitre est consacré au cycle de l'azote, tandis que le 7e et le 8e étudient les cycles du soufre et du fer.

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Ce bref rappel des têtes de chapitres montre l'intérêt de ce livre qui complète admirablement les traités classiques de limnologie où la biologie des bactéries aquatiques est quelque peu négligée.

Des schémas, des graphiques nombreux et une centaine de tableaux complètent ce livre qui se termine par une copieuse bibliographie et un index alphabétique.

Il faut remercier le Dr Pochmann d'avoir, par sa traduction en allemand, mis ce travail à la portée de tous ceux qu'intéressent les phénomènes biologiques lacustres.

P. By.

Lewin J. C., Lewin R. A. et Philpott D. E — Observations on *Phaeodactylum tricornutum*. — *Journ. gen. Microbiol.* 18, p. 418-426, 2 pl.

Lewin J. C. — The taxonomic position of *Ph. tricornutum*. — *id.*, 18, p. 427-432, pl. 1958.

Les auteurs étudient, sur culture, cet organisme assez énigmatique, souvent appelé *Nitzschia closterium* fo. *minutissima*. Ils montrent que cette algue unicellulaire se présente sous deux phases normales : 1) cellule fusiforme, à membrane nue, sans silice; 2) cellule ellipsoïdale à deux valves différentes, l'une nue, sans silice, l'autre siliceuse, possédant un raphé recourbé rappelant *Cymbella*. Les formes triradiées, dépourvues de silice sont anormales.

Phaeodactylum est donc une diatomée à structure très particulière, diatomée qui devient le type d'une nouveau sous-ordre : celui des *Phaedactylineae*, proche des *Monoraphidineae*, caractérisé par une valve nue, sans silice, et une valve siliceuse portant le raphé et des stries ponctuées.

De belles photographies au microscope électronique confirment pleinement ces résultats particulièrement intéressants.

P. By.

Parke M., Manton I. et Clarke B. — Studies on marine flagellates III. Three further species of *Chrysochromulina*, IV, Morphology and microanatomy of a new species of *Chrysochromulina*. V, Morphology and microanatomy of *Chrysochromulina strobilus nov.* sp. — *J. mar. biol. Ass. U. K.*, 35, 37, 38, 1956, 1958, 1959.

Dans ces trois articles, illustrés par de splendides photographies de coupes au microscope électronique, les auteurs étudient 6 nov. sp. de *Chrysochromulina*. Ce sont des Chrysophycées monadoïdes à deux flagelles égaux ou subégaux, flagelles lisses sans mastigonèmes latéraux. Ces cellules sont pourvues d'un *haptonema*, plus ou moins long. La coupe de l'haptonema au microscope électronique montre qu'il s'agit d'un organite très différent d'un flagelle : il présente 3 membranes concentriques entourant 7 fibres disposées en couronne. Chez une autre espèce, l'haptonema n'a que 6 fibres, mais toujours trois membranes. Parmi les espèces étudiées, certaines malgré la structure identique des flagelles, ont une nage hétérodyname et parfois, une légère inégalité de longueur des 2 fouets. Ces beaux travaux contiennent de plus une

Source : MNHN, Paris

foule de renseignements très précis sur la Cytologie des *Chrysochromulina*, structure des plastes, des pyrénoïdes, des mitochondries, de l'appareil de Golgi des corps mucifères, des écailles, des épines, etc...

P. By.

POCHMANN A. — Uber *Choanogaster*, einen neuen farblosen Salzflagellaten vom Urmia-See. — *Arch. f. Protist.*, **103**, 3/4, p. 507-530, 2 pl. 1959.

— Uber die Tätigkeit der nichtkontraktilen Importvakuole and dem Modus der Osmoregulation bei dem Salzflagellaten *Choanogaster* nebst Bermerkungen über die Funktion der Pusulen. — *Ber. Deut. Bot. Gesell.*, **72**, 2, p. 99-108, 1959.

Dans une récolte des bords du lac Urmia (Iran) en eau sursalée : environ 20 %, l'auteur découvre un très curieux flagellé incolore pourvu de 4 flagelles apicaux, inégaux et d'un système vacuolaire complexe rappelant l'appareil pusulaire des péridiniens marins. Ce système vacuolaire est sans doute une adaptation à un milieu fortement hypertomique. Ce nov. gen. est le type d'une nouvelle famille du nouvel ordre des Choanogasterales.

P. By.

PRAUSER F. — *Diacronema vlkianum* eine neue Chrysomonade. — *Arch. f. Protist.* **103**, 1/2, p. 117-128, 4 fig., 1958.

En 1938, VLK dans son travail classique sur la structure des flagelles (*Arch. Protist*, **90**), avait décrit et figuré un petit flagellé à plastes jaunes et à 2 fouets inégaux, dépourvus de mastigonémes. Ce flagellé, incomplètement décrit et non nommé, a été retrouvé par l'auteur et étudié avec soin. L'examen au microscope électronique des fouets de cet organisme, confirme les observations de VLK. L'auteur rapproche le nouveau genre des Isochrysidales et crée une nouvelle famille des *Diacronemataceae*.

Remarquons que parmi les espèces de *Chrysochromulina* découvertes par PARKE, MANTON, et CLARKE figurent des espèces possédant des fouets isomorphes et hétérodynames, présentant parfois de légères inégalités de longueur (1 à 3 μ).

P. By.

Le Gérant : R. LAMI. — IMP. MONNOYER, LE MANS.

MNHN Paris